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SYMPOSIUM ON LESIONS OF THE SMALL BOWEL

DISEASES OF THE JEJUNUM AND ILEUM; DIAGNOSIS AND TREATMENT

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NEW ORLEANS

Some years ago students were permitted to omit the study of diseases of the small intestine. I refer to that part of the small intestine from the ligament of Treitz to the ileocecal valve. This part of the tract was regarded as relatively free from pathological changes, and of those diseases recognized, knowledge was extremely limited. In more recent years much has been added to the literature in the study of inflammatory diseases of this portion of the small intestine.

In the early days little was known of the syndrome known as sprue, supposedly confined to tropical zones. Steatorrheas, deficiency states, and avitaminoses, as affecting the small bowel were unknown.

NUTRITIONAL DISTURBANCES

Sprue, as it is known today, is not considered just a nutritional disease of the tropics. Most investigators consider tropical and nontropical sprue as probably the same disease with few differences. Herter's infantilism is a similar disease in children, and Gee-Thaysen's disease is the same disease entity in adults. They all may be included under the heading of idiopathic steatorrhea.

Miller and Rhoades,[1] Castle,[2] and Mackie,[3] consider these syndromes, the most typical of which is sprue, as nutritional disturbances, and vitamin deficiencies. Weight loss, inability of the small bowel to absorb lipids, glossitis, and stomatitis are usually found in cases of this syndrome.

There are some differences of opinion as to whether celiac affection in children is identical with the disease in adults, and whether the syndrome developing in the tropics is of a different nature from that arising in other areas. It seems certain that whenever and however the sprue syndrome may arise, the fundamental defect is one of intestinal absorption. There have been similar symptoms observed in two groups of conditions in which the pathologic cause of the absorptive difficulty may be demonstrated; one group represents a short circuiting of food from upper to lower part of the gastrointestinal tract.[4,5] A similar abnormality has been produced in dogs by resection of all or part of the small intestine.[6]

These syndromes are most often associated with a macrocytic anemia. A decalcification and rarefaction of bone may take place due to loss of calcium. This loss of calcium is due indirectly to the inability of the bowel to absorb fats; fatty acids and soaps combine with the calcium and are passed out.

With the loss of lipids from the stool, there is also a loss of the fat soluble vitamins. Vitamins A, D, and K, depend upon

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their solubility in fats for intestinal absorption. The deficiency in A may result in epithelial changes; with D deficiency, calcium and bone rarefactions; with K deficiency, a tendency to hemorrhage.

Crohn[7] reports no distinct or constant pathologic changes in the small intestine of man in the advanced or fatal cases of sprue. Thaysen,[8] Mackie and Fairley,[9] (8 cases), and Snell,[10] (3 cases), found no distinctive gross, or microscopical changes in the wall of the small intestine. Grossly, there has been noted some thinning of the bowel wall. Crohn[7] further reports that there is some congestion and the villi appear shrunken and almost acellular. Except for round cell infiltration, no microscopic changes are noted. At times there may be superficial ulcerations, but the process is not one of inflammation and certainly not granulomatous.

Castle and Rhoades[11] suggested that in sprue there is a deficiency of an intrinsic factor, possibly resident in the secretion of the stomach or in the wall of the small bowel, or in both. This intrinsic factor, they further suggest, controls and makes possible fat absorption from the bowel, fat utilization by the liver, and normal hemopoesis. As in pernicious anemia, we have an achylia, and frequently an atrophy of the gastric mucous membrane associated with the loss of the intrinsic factor. It is thought that the achylia is not the primary factor, but rather the atrophy of the mucosa, in causing the loss of the intrinsic factor. In sprue, Crohn[7] suggests that the atrophy that does occur is part of the pathological picture. It may or may not be the cause of the disease, but rather may be the result of the loss of the intrinsic factor, which controls fat absorption and blood formation. Miller and Rhoades suspected that a diet deficient in vitamin B was responsible for the atrophy and the lack of elaboration of the intrinsic factor.

Miller and Rhoades[1] subjected young swine to Goldberger deficiency diet such as is used to produce black tongue in dogs. These animals all developed stomatitis, achlorhydria, and anemia, as well as diarrhea, fatty stools, and signs of peripheral nerve injury. The anemia was of the hypochromic type. The administering of vitamin B_1, to control animals, prevented the above.

The degree of anemia in sprue does not parallel and is not consistent with fluctuation in gastric secretion.[1] The deficiency in hemopoesis seems to be more related to atrophic changes and the existence of the intrinsic factor in the bowel wall.

Radiographic changes have been described that note disturbances in physiology and anatomy of the upper small intestine, as characteristic in sprue.[11-14] The changes described consist of alterations in the mucosal relief with segmentation and clumping in the upper loops, and evidences of delayed motility. The barium is clumped in masses with the contour of the bowel smoothed out. Ross Golden[15] noted radiological changes in the small intestine (mainly in the jejunum) in 7 out of 11 cases of celiac diseases in children, and in 3 cases of idiopathic steatorrhea in the adult. He noted the same tendency of the barium to isolate itself into segments. Kantor[17] coined the term "moulage sign" for the appearance of the bowel in cases of steatorrhea, the appearance being that of wax in a smooth container.

The diagnosis of sprue is difficult, as the condition may be overshadowed by other nutritional disturbances. Tropical and nontropical sprue are probably the same conditions; the latter being probably more chronic than the former. In sprue, we have either normal free hydrochloric acid in the gastric secretion or else a hypochlorhydria, rarely an achlorhydria. Whereas normal stools contain about 28 per cent fat, stools of patients with sprue have about 70 per cent. Blood calcium and phosphorus are low in sprue. The glossitis, steatorrhea, wasting, weakness, anemia, abdominal distention, and disturbances of calcium and phosphorus metabolism are typical of this syndrome.

The x-rays of the small intestine in sprue, as described by Castle and Rhoades,[11] Snell,[12] Mackie and Pound,[13] Miller and

Baker,[14] are typical. Tuberculous enteritis, enterocolitis and chronic pancreatitis may be differentiated by a study of the history and symptomatology.

The treatment of sprue and its associated allied conditions is more or less the same: Rest in bed, diet low in fats and carbohydrates, high in red, rare meats. Folic acid and B_{12}, have been reported as very effective. Bananas are recommended. Calcium and phosphorus should be included in the medication. Very intense liver extract therapy should be administered.

VITAMIN DEFICIENCY STATES

Nutritional and vitamin deficiency states affect the small intestine. Deficiency pattern of the small intestine may complicate such conditions as chronic ulcerative colitis, idiopathic steatorrhea, nephrosis, and diabetes insipidus.[18] Vitamin B deficiency, particularly those associated with achlorhydria, may present a picture with anemia, pellagralike dermatitis, peripheral neuritis, and diarrhea. They are further associated with disturbance in fat absorption, so symptoms of calcium deficiency may be present prior to definite signs of vitamin B deficiency. Histological changes in the small bowel have not been established.

Characteristic roentgenological changes are demonstrated in the jejunum, the valvulae conniventes are broadened, the spacings widened and irregular in size. Dilation and stagnation takes place in the upper jejunal and ileal segments. There is a delayed filling in the jejunal loops, while the intestine proximal to and distal from this pooled area is relatively free from barium. In later plates (three to four hours), the ileal loops may present a sausage shaped arrangement. These changes are probably due to edema and changes in the muscular tonus.

Apparently this so-called deficiency pattern then is fairly consistent in sprue and other steatorrheas. Deficiency states of various types tell us a story. This story is simply that these conditions have one thing in common, an inability to absorb vitamins necessary for normal state of tonus, secretory activity, and absorption.

The motility of the small intestine, according to Golden,[19] varies with the severity and duration. Early in the deficiency there is a marked hypermotility through the small intestine. This is associated with a hypertonicity. Later in the course of the disease Golden found a hypomotility with a hypotonicity in the small intestine.

The differentiation of the various fundamental causes of abnormalities of the small bowel is impossible. They may be due primarily to lack of vitamins, hypoproteinemia, or disease of the liver. Golden's[19] cases were relieved by parenteral or oral administration of liver extract and vitamin B complex. There was improvement in intestine function as noted by radiographic examination in each case appropriately treated for vitamin deficiency.

INFLAMMATORY DISEASES

Acute enteritis is a diagnosis that is really made by inference and by exclusion. History is important in making this diagnosis. Others in the family may be simultaneously affected, pointing to some food or like poisoning. Food and drink are the frequent offenders in producing acute enteritis. The eating of decomposed, fermented, or putrified foods accounts for many epidemics of acute enteritis. Alcohol taken in excessive amounts or by susceptible persons is a frequent cause. Certain medicines such as drastic cathartics, salicylates, cinophens, and such poisons as arsenic, lead, and mercury, may produce an acute enteritis.

Deficiency states, allergy, phychoneurosis, or achlorhydria, may be predisposing causes. The presence of free hydrochloric acid in the gastric contents acts as a protection against certain pathological organisms. Acute enteritis may be secondary to acute infectious diseases.

Acute enteritis is characterized by acute onset of intestinal symptoms, both upper and lower. Slight nausea is followed by vomiting, diarrhea, more or less, with or without fever. There is abdominal discomfort usually crampy in type, and associated with borborygmus. Physical findings present general soreness of the abdomen. Stool

cultures are usually negative for the dysentery groups of organisms. Stool examinations are generally negative for ameba, or other parasites. Sigmoidoscopic examinations may reveal no change in the mucous membrane unless the attack has been prolonged, then there may only be some mild congestion or edema of the mucous membrane of the rectum and sigmoid. This usually is due to trauma of many stools.

After acute surgical conditions have been excluded, the treatment should be directed towards cleansing the gastrointestinal tract. Castor oil seems to be the laxative of choice. The diet should be simple. For the first twenty-four hours, tea, black coffee, clear broth, dry toast, should be given. After this, we gradually add soft, nonirritating foods such as gelatin, cooked cereals, soft eggs, custards, mashed potatoes, rice, and pureed vegetables.

In severe cases parenteral fluids may be given. Occasionally small doses of paregoric may be needed to relieve intestinal cramps after the purgative has been effective. Sulfathaladine given in gram doses seems to reduce the fermentative organism. Occasionally pectin, bismuth, kaolin, and belladonna are indicated to relieve tenesmus.

The diagnosis of chronic enteritis to account for symptoms related to the small intestine is rarely made. This condition may be just the results of a protracted acute enteritis or secondary to other chronic intestinal disturbances such as prolonged constipation or ileal stasis. Hypermotility of the gastrointestinal tract associated with functional disturbances may predispose to chronic enteritis.

The treatment of chronic enteritis is directed towards the condition which seems to produce this state. Usually a nourishing bland, low residue diet, well fortified with vitamins is given. Hydrochloric acid should be prescribed if achlorhydria is present. Again, the diarrhea may be relieved as in acute enteritis.

The small intestine may be the seat of allergic reaction as demonstrated by the following cases:

CASE REPORTS

Case 1. H. J. B., male, age 10 years. Current complaint, abdominal pain.

Present illness: Severe pain around umbilicus, usually one hour after eating. Pain associated with nausea, but no vomiting. Loss of 1½ pounds in weight in the past month. Treatment consisted of antispasmodics and psychotherapy to no avail.

All laboratory findings, including blood count, gastric analysis, and urine analysis, were within normal limits.

Physical examination: Marked tenderness above umbilicus. Impression of small masses palpable just above and below the umbilicus.

X-ray at Touro Infirmary: Gastric and intestinal motility so rapid that within twenty minutes after ingestion of meal, head of the column was in the colon.

Surgery: Dr. J. D. Rives opened abdomen and noted recurrent intussusceptions of jejunum. No tumors were palpated. Abdomen closed.

Treatment: Elimination diet: With the elimination of milk, all subjective and objective symptoms disappeared.

Figure 1.

Case 1—Intussusceptions of the small bowel.

Case 2. C. H., female, age 8 years. Current complaint: Pains around umbilicus.

Present illness: Onset one year ago with pains

around the umbilicus,—periodic. Occasional nausea and vomiting. Bowels moved daily. Attacks usually four or five times daily. The pain did not interfere with play.

All laboratory findings including blood count, gastric analysis, and urine analysis, were within normal limits.

Physical examination: Abdomen, marked tenderness below the umbilicus.

X-ray at Touro Infirmary: Serial fluoroscopy and films of the small intestine reveal hypermotility and abdominal segmentation, multiple unquestionable short segmented intussusceptions are visible.

Treatment: Elimination diet. With the elimination of milk, and a low residue diet, and with the use of elixir benadryl, produced complete relief.

In this last case, there was a question of some possible psychoneurosis producing a neuromuscular imbalance, but again antispasmodics and psychotherapy produced no results.

Case A. J. T., male, 49 years of age. Current complaint: abdominal pain.

Present illness: Pains in the right lower quadrant for the past three years, usually fifteen to thirty minutes after meals, lasting about two or three hours. Pain was so sharp that patient had to stop all activity and sit down. Lost 25 to 30 pounds. Low grade fever. He noticed "lumps" in the lower abdomen relieved by massage. Pain worse during constipation, but had bouts of diarrhea.

Figure 2.

Case II—Regional Ileitis.

Physical examination: Abdomen—oblong mass (very tender) palpated in the lower right quadrant. This was freely movable.

All laboratory reports such as blood count, urine, liver function tests, serology, culture from stools, were within normal limits.

X-ray of small bowel: (Touro Infirmary) Interval fluoroscopy and films of the small bowel reveal some delay in transport in pelvic ileum. Proximal small intestine is normal. A segment of terminal ileum is constantly narrow and exhibits a degree of flexibility and distensibility which weighs against neoplasm (lymphoblastoma) and favors a chronic inflammatory process. Hypothesis nonspecific regional ileitis.

Surgery: Ileum involved for 8 inches up from ileocecal valve. Mesentery edematous. Ileotransversostomy done.

Crohn, Ginsburg, and Oppenheim, in 1932, segregated from the miscellaneous group of benign nonspecific granulomas 13 cases which exhibited a necrotizing and cicatrizing inflammation. They used the term "regional ileitis" to designate this pathologic and clinical entity.

The clinical features of regional ileitis are the presence of diarrhea, lower abdominal pain, fever, loss of weight, and anemia. As the disease progresses, a mass may be palpated in the lower abdomen, usually to the right. This condition may advance to partial or complete obstruction. Crohn[7] described fistulous tracts that may be formed between this regional ileitis, the rectum, or possibly to the exterior.

This same process may be found anywhere along the small bowel and has been termed segmental ileitis. Crohn[7] also described a clinical entity which resembles regional ileitis very closely. This condition he terms ileojejunitis. It is characterized by the same clinical symptoms as regional ileitis, but there is no palpable mass, no tendency towards fistula formation, nor are there found any obstructive symptoms or signs.

The diagnosis of regional ileitis is mainly dependent upon x-ray examination. In the early phase of the disease, even the x-ray may be of little help in the diagnosis. The presence of the "string sign" described by

Kantor and others, with some dilatation of the proximal loops of the small bowel are very suggestive of regional or segmental ileitis.

Often a diagnosis of acute appendicitis is erroneously made. The differentiation from malignant tumors may be made by a shorter history, age of patient more advanced, greater anemia, firmer and more nodular mass, and the roentgen defect more circumscribed. Many benign tumors, and tuberculous enteritis may resemble regional ileitis clinically and radiologically. This may only be differentiated by laboratory examination.

Treatment of the acute case may be conservative early. The chronic case of regional ileitis requires surgery. Those cases: (1) producing obstruction, (2) with fistula formation, (3) with abscess formation, (4) with perforation and peritonitis, require immediate surgery.

The type of surgery is a controversial issue. Mortality seems equally as great with side-tracking operation as with resection.

Tuberculosis of the small intestine is just an incident in a widespread disease. It occurs in most cases of generalized or advanced cases of pulmonary tuberculosis. The lymphoid tissue of the bowel is where the lesion usually begins. The lower ileum and ileocecal areas are the usual sites for tuberculosis involving the small bowel.

Local or constitutional symptoms predominate, with fever, malaise, weakness, anorexia, and loss of weight. Abdominal discomfort is manifested by abdominal cramps and perpetual diarrhea. Physical examination usually reveals extensive pulmonary tuberculosis; generalized abdominal tenderness with finally a "doughy feel" to the abdomen.

Diagnosis of tuberculosis of the small bowel can only be confirmed by the finding of tuberculosis elsewhere. Radiological study of the gastrointestinal tract is of help. The Stierblin sign, which is the failure of the cecum and the ascending colon to retain barium is suggestive. The segmentation of the coils of the small intestine with dilatation of some loops, in conjunction with finding of tuberculosis elsewhere in the body are fairly indicative of tuberculous involvement of the small intestine.

The treatment of small intestine tuberculosis is general. Rest, fresh air, high vitamins, high caloric diet, are essential. The diarrhea may be controlled with pectin, bismuth, kaolin, or the opiates. Streptomycin with para-aminosalicylic acid may be of help.

Primary tumors of the small intestine are quite rare. The diagnosis can only be suspected in cases of obstruction or bleeding. The small intestine barium series will establish the diagnosis in a high percentage of cases. The treatment is surgical.

PARASITIC

The small intestine is the resting place of certain parasites such as *Giardia lamblia*, *Necator americanus* (hookworm), *Strongyloides sterocoralis*, and *Ascaris lumbricoides*. These may cause various and sundry upper and lower gastrointestinal disturbances. The ascaris have been known to appear in such numbers that they may produce an intestinal obstruction.

The diagnosis of intestinal parasites depends upon finding the ova or parasites in the duodenal drainage or in stool examinations. The treatment is specific: for *Giardia lamblia*, atabrine; for hookworm, tetrochlorethylene, thymol or carbon tetrachloride; for strongyloides, gentian violet; for ascaris, hexylresorcinol, santonin, or oil of chenopodium.

DIVERTICULA

Diverticula of the small intestine are rare, and when present, are usually in the jejunum. They may produce vague abdominal pains and flatulence. Occasionally, a diverticulosis will produce an ulcer-like syndrome. The diagnosis is made by roentgenological study of the small intestine.

The treatment of diverticulosis of the small intestine is usually conservative, strict low residue diet, rest, mineral oil, an tispasmodics. Surgery is reserved for the complication, including inflammation, obstruction, and perforation.

A congenital out-pouching of the ileum, or remnant of the omphalomesenteric duct was described by Meckel. Symptoms are rarely caused by this remnant unless complications arise. These complications may be: (1) acute inflammation; (2) perforation from ulcer or impacted foreign body within the pouch; (3) obstruction due to the incarceration of a loop of bowel in, under, or around the cord extending from the diverticulum; (4) may become adherent within a hernia sac.

All the symptoms and signs of an acute abdomen associated with or without obstruction may be attributed to Meckel's diverticulum. The x-ray diagnosis is very difficult. The diagnosis is usually made at surgery.

SUMMARY

1. Sprue, Herter's infantilism, Gee-Thayson's disease, and idiopathic steatorrhea are nutritional disturbances associated with inability of the small bowel to absorb lipids. Castle described lack of the intrinsic factor in the small bowel wall as the cause. This syndrome produces typical radiological changes in the small bowel pattern. Treatment consists of the use of folic acid, B_{12}, parenteral liver extract, diet low in fats and carbohydrates, but rich in rare meats.

2. Nutritional and vitamin deficiency may affect the small intestine. Anemia, dermatitis, peripheral neuritis, and diarrhea may result. These deficiencies produce a typical radiographic "deficiency pattern" in the small intestine. Administration of deficiency substance results in return of small intestinal function.

3. Acute enteritis is a diagnosis made by inference and exclusion. There are many predisposing and primary causes, including decomposed foods, excessive alcohol, drugs, and poisons. Treatment after excluding surgical conditions is use of castor oil and nonfermenting, low residue diet.

4. Chronic enteritis is diagnosis which is rarely made. The condition is usually the result of protracted acute enteritis.

5. Regional ileitis or segmental ileitis is a term used to describe a benign granulomatous condition of the small intestine which has a tendency to exhibit a necrotizing and cicatrizing inflammation, and produces abdominal pain, fever and diarrrhea. Occasionally a mass may be palpated in the lower abdomen. Radiographic studies are fairly suggestive with presence of "string sign". Treatment is usually surgical.

6. Tuberculosis of the small intestine is secondary to tuberculosis elsewhere in the body, usually pulmonary. Small bowel involvement brings about abdominal cramps and diarrhea. Treatment is general.

7. Primary tumors of the small intestine are rare. Tumors manifest themselves in bleeding or obstruction. Diagnosis is made usually by x-ray. Treatment is surgical.

8. The small intestine is the resting place of certain parasites. They are *Giardia lamblia*, hookworm, ascaris, and strongyloides. Diagnosis is made by stool examinations. Treatment of each is specific.

9. Diverticula of the small intestine are rare. They may produce vague abdominal pains. Diagnosis is made roentgenologically. Treatment is usually conservative. Complications are met with surgery.

10. Meckel's diverticulum is a congenital out-pouching of the ileum, and rarely produces symptoms without complications. These complications are those of an acute abdomen. Treatment is surgical.

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PATHOLOGY OF CERTAIN INFLAMMATORY LESIONS AND NEOPLASMS OF THE SMALL BOWEL*

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NEW ORLEANS

The purpose of this paper is to present primarily the gross pathologic changes of those inflammatory lesions and neoplasms of the small bowel, in which the findings are characteristic and, at times, pathognomonic. Where pathogenesis contributes to the better visualization of the final gross lesion, it will be summarized.

A. INFLAMMATORY LESIONS

1. *Bacillary dysentery.* While the lesions of bacillary dysentery are most frequent and severe in the sigmoid and rectum, Macumber[1] in a study of 31 autopsy cases found the small intestine, especially the ileum, also involved in 71 per cent. Early, the lymph follicles are enlarged and appear as gray grains of sand on a red background of inflamed mucosa. Later, the follicle centers become necrotic, resulting in multiple small ulcers, which may coalesce and form widespread zones of discrete and confluent ulceration. The ulceration is characteristically superficial, extending only to the submucosa. The mucosa between the ulcers is red and edematous. In approximately 45 per cent of these cases, there is a pseudodiphtheritic membrane, comparable to the tough fibrinous membrane in the upper respiratory tract in diphtheria. The bowel wall, particularly the submucosa, is edematous.

In dogs and rabbits, Penner and Bernheim[2] have shown that the toxin of the Shiga strain of the dysentery bacillus has no effect on direct contact with the intestinal mucosa. The lesions in the intestinal tract, produced both by intravenous injection and by intestinal absorption of the Shiga toxin, are interpreted as the anatomic end result of prolonged and severe vasoconstriction in the intestine. The latter occurs as a compensatory response to the shocklike circulatory state, following injection or absorption of the Shiga toxin. This explanation is corroborated by their finding that in tissue cultures the concentration of Shiga toxin necessary to inhibit growth and kill explants of intestinal mucous membrane is extremely high. It is probable that in some cases in man a similar pathogenesis of the lesions is operative.

2. *Typhoid fever.* In 78 large cities in the United States, the annual death rate from typhoid per 100,000 population has decreased from 20.54 in 1910 to 0.34 in 1941.[3] The disease is thus of less importance at present than a few decades ago.

The intestinal changes in typhoid fever are most prominent in the small bowel, particularly the ileum. The character of these lesions depends on the duration of the disease. During the first week, there is swelling of the lymphoid follicles and Peyer's patches.[4] The adjacent mucosa is hyperemic and edematous. At the beginning of the second week, small foci of coagulation necrosis appear in the hyperplastic lymphoid tissue (Fig. 1). About the middle of the second week, the necrotic tissue sloughs out and an ulcer is formed. Typically, the long axis of the larger ulcers is parallel to the long axis of the intestine. This is the result of their origin in Peyer's patches. Numerous small round ulcers originate in solitary lymphoid follicles. By the begin-

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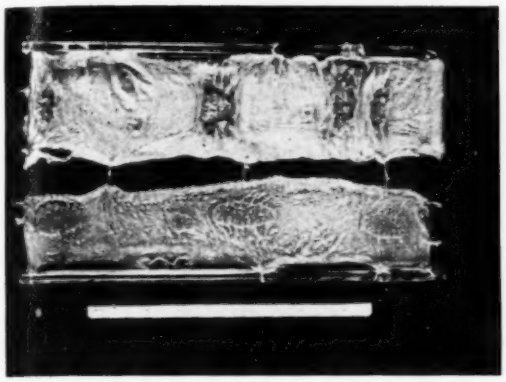

FIG. 1. Tuberculous enteritis (above) and typhoid, (below). The Peyer's patches and solitary lymphoid follicles in the typhoid lesions are greatly swollen and show beginning ulceration. The long axis of the ulcers is parallel to the long axis of the bowel. The tuberculous ulcers are irregular and are roughly transverse ("Girdle ulcers") to the long axis of the intestine.

ning of the third week, the height of the inflammatory process has been reached. The ulcers are sharply punched out and slightly undermined. Their bases are smooth. It is in this stage that hemorrhage and perforation are most likely to occur. Toward the end of the third week, healing begins. Hyperplastic lymphoid tissue fills the defect and epithelium covers the surface. A scar forms, if the ulcer has been deep.

3. *Tuberculosis.* Tuberculous enteritis may be primary or secondary. The incidence of primary tuberculous enteritis has fallen sharply due to pasteurization of milk and inspection of cows. In a survey of case records at the Cleveland City Hospital, Reichle[5] found a ratio of 1 primary intestinal infection to approximately 17 primary in the lungs. In a small number of cases with caseous or calcified lesions of mesenteric lymph nodes, a healed and calcified lesion of tuberculosis may be found in the intestine, usually the terminal ileum.[6] These tuberculous lesions of the intestinal wall and adjacent lymph nodes are comparable to the primary complex in the lung and tracheobronchial lymph nodes. With a primary complex in the intestine and mesentery, lesions of a first infection in the lung are likely to be absent. The intestinal lesion may be overlooked or it may heal completely. Failure to find it should not be incorrectly interpreted as evidence that tubercle bacilli have passed through the intact intestinal wall to the mesenteric lymph nodes.

Secondary tuberculous enteritis is present in approximately 70 per cent of fatal cases of pulmonary tuberculosis.[7] The patient swallows sputum loaded with tubercle bacilli, which then invade the intestinal mucosa. Less commonly, bacilli reach the intestine by the blood stream, or by direct or lymphatic extension from a primary focus of infection elsewhere.

The ileum is involved in 89 per cent of cases.[7] The abundant lymphoid tissue, the large surface area of the villous folds, and the slowed fecal stream probably favor the implantation of the bacilli in this site. In the lymphoid tissue of the mucosa and submucosa, the bacilli proliferate, evoking characteristic tubercle formations. The area undergoes necrosis and the necrotic material sloughs out. The resulting ulcers are irregular and discrete. The bacilli spread through the lymphatics, running circumferentially in the submucosa and subserosa of the bowel wall. The typical "girdle" ulcers are thus produced. Their long axis is transverse to the long axis of the intestine (Fig. 1.) Adjacent ulcers often become confluent. Frequently, there are tubercles in a linear pattern along the lympathics in the serosa. The bowel wall may be thickened at these sites. The ulcers perforate in about 4 per cent of cases.[7] On the other hand, they may regress and even heal with fibrosis and partial or complete epithelial regeneration. The mesenteric lymph nodes frequently contain tubercles and caseous foci.

4. *Syphilis.* In a series of 8,856 consecutive autopsy records at Charity Hospital in New Orleans (1929 - 1937), 3 cases of intestinal involvement in congenital syphilis were found.[8] These constituted 1.3 per cent of the 230 cases of syphilis in infants who came to autopsy. Approximately half of these in-

fants are stillborn; 27 per cent live twenty-four hours; and only very few reach the age of two or three years. The most common lesion is a raised yellow plaquelike band, encircling the bowel (Fig. 2). There

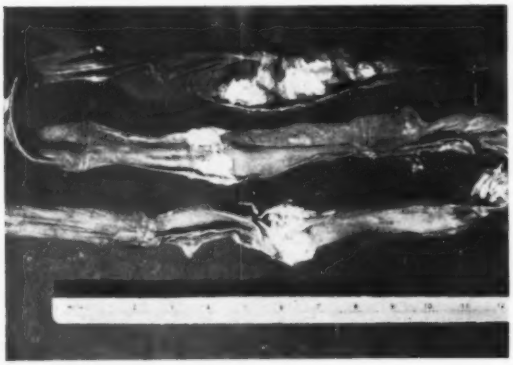

FIG. 2. Thickened plaques in wall of small intestine in congenital syphilis.

may be ulceration and perforation with peritonitis. In some cases, peritonitis occurs without demonstrable perforation. These lesions are usually in the small intestine, especially the last portion of the ileum. Miliary syphilomas and abscess-like foci are also seen.

In acquired syphilis, intestinal lesions are rare but do occur. They are multiple and annular, and may be either punched out, clean, granulating ulcers, or gummas of the wall.[4]

5. *Actinomycosis.* In the abdominal type of actinomycosis, there is extensive fibrosis of the bowel wall usually in the ileocecal region, with numerous abscesses and fistulous tracts leading from the lumen of the intestine.[4] The characteristic "sulfur granules" (colonies of actinomyces) are often present. The associated adhesions, acute inflammatory exudate, and enlarged lymph nodes may lead to intestinal obstruction. In some cases, the diagnosis is established only at the time of operation for a suspected appendicitis. Persistent fistulae are likely to result from such an operation.

6. *Parasites* (*Helminths*). There are four important parasitic worms which produce lesions of varying degrees of severity in the small intestine. These are: Tapeworms, round worms (ascaris), hookworms, and *Strongyloides stercoralis.* Both the tapeworm and the round worm produce minimal lesions in the intestine—slight inflammation, petechiae, or minute areas of superficial ulceration. Rarely, in cases of heavy infestation with either round worms or tapeworms, a mass of worms may obstruct the intestine. There is a center of heavy ascaris infestation in South Central Louisiana.[9] In autopsies at Charity Hospital in New Orleans, not infrequently one finds large numbers of these worms in the small intestine of children. Improved sanitation and the prevention of fecal contamination of soil will control ascaris infestation.

In hookworm disease, the parasites are present in the jejunum and ileum. There are mucosal petechiae and ecchymoses, often with superficial ulceration in the centers.[4] Worms may be found attached to the mucosa. The anemia quite constantly seen in this disease is the result of loss of blood by the action of the parasite in the intestine, nutritional deficiency, and defective absorption of food. The peak age incidence (24.5 per cent) is between 15 and 19 years. Negroes are affected less frequently than whites in the proportion of about 1 to 4.[10]

Of the four worms named above, Strongyloides produces the greatest degree of intestinal damage. Most of the worms live in the duodenum and jejunum.[11] The mucosa is swollen, red, and soft. Mechanical and lytic damage results in honeycombing of the depths of the mucosa, sloughing and ulceration. The closeness of contact between host and invading worms in this disease is perhaps reflected by the conspicuous eosinophilia, as high as 40 per cent.

7. *Deficiency diseases.* In pellagra, there is inflammation of variable degree throughout the gastrointestinal tract. In tropical sprue, the wall of the intestine is thin and the mucosa is atrophic, with few glands and inconspicuous lymphoid tissue.[4] In some cases of nontropical sprue, the cause is found to be a small or large tumor blocking the entrance of the pancreatic duct

into the duodenum. The intestinal mucosa is usually atrophic.

8. *Regional enteritis.* Although the terminal ileum is involved in approximately 85 per cent of these cases, the disease may be found anywhere from the jejunum to the sigmoid with "skipped areas" between multiple areas of involvement.[12] Neither the immediate cause nor the primary site of the disease has been established.[13] Reichert and Mathes,[14] Hadfield,[15] Erskine,[16] and Bockus[13] suggest the following pathogenesis. Possibly the primary lesion is in the lympathic structures or even the mesenteric lymph nodes (a mesenteric lymphadenitis). Involvement of these structures is accompanied by obstruction to lymphatic drainage and edema of the intestinal wall (particularly the submucosa) and the mesentery. The involved segment of bowel, lacking proper drainage, becomes infected possibly by bacteria within the lumen or by organisms reaching the bowel in retrograde flow from infected lymph nodes. Erskine[16] found a variety of organisms (streptococci, colon bacilli, and tubercle bacilli) in lymph node cultures of three of his cases, all showing the same histologic reaction in the bowel wall. This theory of pathogenesis offers a possible explanation for the microscopic picture suggestive of tuberculosis in some cases of regional enteritis since it would be possible for regional enteritis to be initiated in these cases by primary enteric or glandular tuberculosis. The primary tuberculous infection, although overcome, might leave in its wake permanent damage to lymphatics with obstruction to drainage from the intestine, paving the way for the inroads of secondary infecting organisms, other than the tubercle bacilli, which might initiate the lesions of regional enteritis.

Grossly, the involved segment of bowel shows a greatly thickened, heavy, leathery wall with narrowing of the lumen (Fig. 3). The mucosa is thickened and ulcerated. Linear longitudinal folds of edematous mucosa and submucosa with linear ulcers are common. Fistulae may extend from the ulcers into other loops of bowel or into the mesentery. The mesentery is thick, edematous, and indurated. The mesenteric lymph nodes are enlarged. Strikingly, the muscularis is not hypertrophic. Thus, the increased thickness of the wall is due to the edema and fibrosis of the mucosa and submucosa. The pathologic features develop gradually, progressing through the acute, ulcerative, obstructive, and fistulous stages. These stages have their clinical counterparts which are not separate diseases but varied manifestations of the same disease. Fistula in ano is said to occur in 15 per cent of all cases.

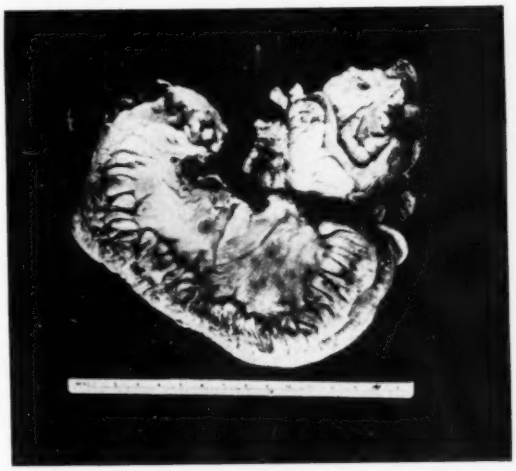

FIG. 3. Regional enteritis, involving the terminal ileum. The bowel wall is greatly thickened, the lumen narrowed. The mesentery is thick and its fatty lobulations are prominent.

9. *Diverticulitis.* Duodenal diverticula are not common clinically. However, by injecting plaster of paris into specimens of the duodenum at autopsy, Ackermann[17] found 14 diverticula in 11 of 50 cases. These lesions are globular, funnel-shaped, or cylindrical protrusions usually from the concave, pancreatic border of the duodenum. They are often congenital anomalies and some may represent abortive attempts to form a supernumerary pancreas. In Ackermann's cases, the diverticula were almost equally distributed in the second, third, and fourth parts of the duodenum. Rarely, these diverticula may become inflamed, gangrenous, or undergo perforation, but usually they have no clinical manifestations.

Aside from Meckel's diverticulum, rare diverticula of the jejunum and ileum occur, particularly in the upper jejunum. In this segment, the longitudinal coat of the muscularis is often missing or thin along the mesenteric border, especially when fat is abundant between the leaves of the mesentery. Also, the vessels penetrating the wall on the mesenteric border are larger in the jejunum than below, causing defects through which diverticula may originate.[18] Increased intraluminal pressure causes herniation of the mucous membrane through the other coats of the wall giving rise to a thin-walled sac, lined by mucous membrane and surrounded by fat covered with peritoneum. Thus, they are false diverticula in contrast to the true congenital diverticula of the duodenum. These lesions may be multiple. They are 2 to 8 cm. in diameter, and of a spherical or mushroom shape. Because of the large, open necks of most of these diverticula, stasis is unlikely and diverticulitis and perforation are rare.

In contrast to these rare acquired diverticula of the small intestine, Meckel's diverticulum is seen in 1 to 4 per cent of all persons. It represents the persistence of a portion of the omphalomesenteric duct. Most commonly, the proximal several centimeters of this duct persist, forming an evagination on the antimesenteric border of the ileum, 2 or 3 feet from the ileocecal valve. The mere existence of this structure is not of clinical significance. In a study of 30 specimens of Meckel's diverticula, however, Aschner and Karelitz[19] found abnormal elements in 13. Gastric mucosa, pancreatic tissue and carcinoids are among these abnormal elements. Associated with heterotopic gastric mucosa, there may be typical peptic ulcers in the adjacent mucosa. These are analogous to duodenal ulcers and probably result from irritation and erosion produced by gastric juice derived from the islands of gastric epithelium. Approximately 50 per cent of such ulcers perforate[19] making imperative the surgical excision of these lesions as soon as they are suspected.

In addition, there may be acute inflammation of Meckel's diverticulum, with swelling, congestion, and suppuration of the structure, in the absence of any heterotopic tissue.

The diverticulum may serve as a starting point for an intussusception of the small intestine. The diverticulum becomes the apex of the intussusceptum.[20]

10. *Ulcers of jejunum.* Primary ulcers of the jejunum have been reported.[21] These are circular and punched out, single or multiple, resembling peptic ulcers of the stomach and duodenum. Most of these terminate in perforation. The site of the lesion may be undetermined until laparatomy is performed.

11. *Lesions associated with vascular occlusion.* In mesenteric vascular occlusion, the infarcted segment of bowel is deep purplish red, soggy, and edematous. The peritoneal surface is glistening. The peritoneal cavity contains transparent, sticky amber or bloody fluid. The mesentery is thick and doughy. The lower jejunum and ileum are the most frequently involved sites. The infarct is usually caused by an arterial embolus (about 60 per cent) or a venous thrombosis (about 40 per cent). In about 25 per cent of the cases, the site of vascular occlusion may not be found.[22] Sudden anemia produced by blockage of any branch of the mesenteric artery sets up so violent a muscle spasm of the affected bowel that the part becomes isolated from the neighboring circulation. Thus the vessels functionally become end arteries and infarction results.

In intussusception, the tension and pressure on the veins of the invaginated segment result in passive congestion and edema of the intussusceptum. This additional swelling further reduces the blood supply, leading to hemorrhagic infarction of the intussusceptum.

The twisting of a coil of intestine about its mesentery in a case of volvulus causes occlusion of blood vessels and infarction of this segment of bowel. Meckel's diverticulum with persistent attachment to the um-

bilicus, may be the center about which the bowel rotates.

B. NEOPLASMS

1. *Benign tumors.* (a). Heterotopias: Before considering the true neoplasms of the small intestine, a few comments are in order concerning heterotopic tissues in this organ. These structures may be confused grossly and microscopically with neoplasms. For the most part, they are congenital anomalies. Taylor[23] has found gastric mucosa, submucous gastric glands, and pancreatic tissue in various portions of the small intestine, as well as elsewhere in the alimentary tract. The islands of heterotopic tissue may be superficial or deep to the muscularis mucosa and may give an appearance of invasion suggestive of a neoplastic process particularly if deeply situated.

(b). Benign epithelial tumors.

Ehrlich and Hunter[24] reported 7 adenomatous polyps in the small intestine in a series of 142 cases of polyps of the alimentary tract. These may be single or multiple, grayish red or pink masses, found most frequently in the duodenum. Cattell and Pyrtek[25] state that these are the most common tumors of the small intestine, though all tumors of the small intestine occur infrequently. It is probable that many of these polyps are secondary to localized areas of inflammation with reactive epithelial hyperplasia. It is not clear whether or not these lesions bear the same relationship to carcinoma as do adenomatous polyps of the large intestine.

(c). Benign mesenchymal tumors.

The most common tumors of this group, and second in incidence of all tumors of the small intestine, are the leiomyomas.[25, 26] These may be submucosal ("inner") or subserosal ("outer"). The submucosal growths are usually smaller but may cause intestinal obstruction by protruding into the lumen. The subserosal ones are larger and bulge as a rounded mass from the antimesenteric surface of the bowel (Fig. 4). They may undergo focal hemorrhagic necrosis. Merging of these necrotic regions and eventual rupture into the lumen of the bowel may cause massive hemorrhage.[27] Subserosal leiomyomas occur more frequently than the submucosal ones in the ratio of 3 to 2. Fibromas, lipomas, and hemangiomas of the small intestine are reported. Fibromas[26] and hemangiomas[28] may be multiple.

FIG. 4. Large "outer" (subserosal) leiomyoma of small intestine.

(d). Carcinoids.

Most pathologists are agreed that carcinoids are derived from the argentaffine cells of Nicolas-Kultschitsky. Porter and Whelan[29] state that carcinoids are found in from 0.2 per cent to 0.5 per cent of appendices removed surgically and that the incidence of these tumors in the small bowel is less than one-half that figure. In the small bowel, carcinoids occur mostly in the terminal ileum. In some cases, they are multiple. They are highly characteristic, bright yellow, nonencapsulated but circumscribed tumors of the submucosa forming a bulge on the mucosal surface. On section, the surface is yellow with white interlacing strands. In the larger ones, extension to the serosa results in adhesions to adjacent structures with kinking and obstruction of the bowel. On the other hand, carcinomas produce intestinal obstruction by an annular constricting growth with narrowing of the lumen. The carcinoids of the small intestine are more likely to show me-

tastases than those in the appendix. This had led to the suggestion that the carcinoids found in obliterated appendices may be the result of proliferation of the argentaffine cells following inflammation, while the tumors of extra-appendiceal origin are true neoplasms.[29]

2. *Malignant tumors.* (a) Carcinoma. Nickerson and Williams[30] found that carcinomas of the small intestine make up about 2 percent of all carcinomas of the alimentary tract. Somewhat more than half of these are primary in the duodenum, the remainder occurring in the jejunum and ileum. Grossly, these lesions may be fungating, ulcerating, or infiltrating (annular) (Fig. 5). They

FIG. 5. Annular, constricting carcinoma of small intestine. Note slight dilatation of proximal segment.

are usually adenocarcinomas. Those occurring in the duodenum at the ampulla of Vater may arise from the epithelium of the duodenum itself, the common bile duct, the pancreatic duct, or the ampulla. Usually by the time these carcinomas are examined pathologically they have involved all of these structures,[31] and it is impossible to determine the exact tissue of origin. Because of this fact, Baggenstoss[32] proposes that these should be designated "carcinomas of the major papilla." Invasion of the pancreas and obstruction of the bile and pancreatic ducts are common complications. Michael and Bell[33] reported a case of adenocarcinoma arising in a Meckel's diverticulum. They found no carcinomas and 7 sarcomas of Meckel's diverticulum previously reported. There is a specimen of carcinoma at the base of a Meckel's diverticulum in our collection. (Fig. 6).

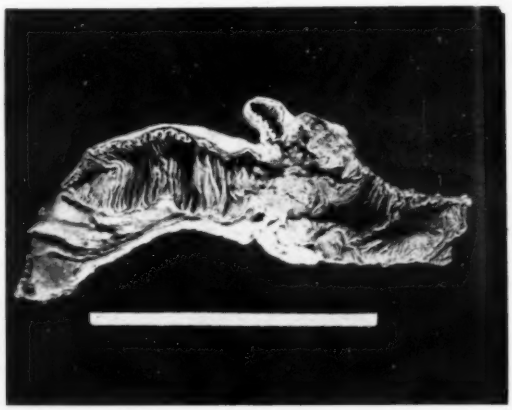

FIG. 6. Carcinoma at base of Meckel's diverticulum.

Sarcomas of the small intestine occur even less frequently than carcinomas. The most important ones are leiomyosarcoma and lymphosarcoma. Leiomyosarcomas are localized masses in the intestinal wall. They may arise in leiomyomas and even when histologically malignant, seldom metastasize. Lymphosarcomas cause diffuse regional infiltration of the intestinal wall with grayish white, friable tissue. At times, they may occur as solitary lesions without involvement of any other tissue in the body and thus present the possibility of cure by surgical excision.

SUMMARY

The gross pathologic changes of certain inflammatory lesions and neoplasms of the small bowel have been presented. Included in the inflammatory lesions are: bacillary dysentery, typhoid fever, tuberculosis, syphilis, actinomycosis, parasitic diseases, deficiency diseases, regional enteritis, diverticulitis, and ulcers of the jejunum. A few of the disorders associated with occlusion of the mesenteric vessels are described. Be-

nign and malignant neoplasms are considered. Of these uncommon tumors, adenomatous polyps, leiomyomas, carcinomas, and carcinoids are most often seen.

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ROENTGENOLOGIC MANIFESTATIONS OF THE SMALL INTESTINE*

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NEW ORLEANS

Examination of the small intestine, if properly done, is one of the most difficult procedures which confront the radiologist. Nevertheless, it is sufficiently accurate to warrant its use whenever a lesion of the small bowel is suspected. In the Mayo Clinic series, Good found an accuracy of 95.8 per cent in regional enteritis and 35.7 per cent in tumors of the small intestine in cases having adequate roentgenologic examination. It requires frequent fluoroscopic and roentgenographic observations, during which an attempt is made to visualize and separate every segment of the barium filled bowel. Lesions seen are recorded on roentgenograms, sometimes obtained as spot films.

INDICATIONS

Roentgenologic examination of the small intestine should not be undertaken until it

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has been proved that there is no lesion in the colon, stomach, or duodenum which might account for the patient's symptoms. Some of the most common presenting symptoms may be those of intermittent obstruction, cramping pain, bleeding, anemia, mass, fistulae, and weight loss.

METHOD OF EXAMINATION

The most satisfactory method of examination of the small bowel is by oral administration of a water suspension of plain barium sulfate. The addition of a 5 per cent glucose or normal saline solution will hasten the transit time but has no particular advantage in making the examination less difficult. The passage of a double tube into the lower ileum and the administration of opaque media through the tube is another satisfactory method of filling the loops of the small bowel but is quite inconvenient to the patient. Once the tube reaches the ileum, the examination requires only ten to fifteen minutes. If the tube is inserted to the second portion of the duodenum, care must be exercised in administering the barium since too rapid injection may cause vascular collapse. In most cases the examination of the lower ileum may be very satisfactorily accomplished by the barium enema technic.

NORMAL APPEARANCE OF SMALL INTESTINE

The small intestine extends from the pylorus to the ileocecal valve and is about 4 meters in length. The diameter decreases from 4 cm. to about 2.5 cm. at the lower end. There are two sections of the small intestine, the duodenum and the mesenteric small intestine, the latter being further subdivided into the jejunum and ileum. The inner aspect shows permanent crescentic folds involving both the mucosa and submucosa and usually extending one-half to two-thirds of the way around the lumen of the bowel. These folds are absent from the first portion of the duodenum but are present in the second portion; they average 5 cm. in length by 3 mm. in the upper small bowel. These folds disappear in the lower ileum. The jejunum occupies the left side of the abdomen; the ileum, the right lower abdomen.

DIVERTICULA

Diverticula are found in any portion of the bowel and they may be single or multiple. They occur at the mesenteric side where the blood vessels pierce the muscularis of the bowel. As a rule, diverticula are found accidentally at roentgenologic examination. The mucosal folds are found in the neck but not in the diverticulum itself. Rarely a diverticulum may cause obstruction, perforation or bleeding. Meckel's diverticulum, which is found in 2 per cent of cases coming to autopsy, is seldom diagnosed roentgenographically. According to Keith, various complications may be peptic ulceration as a result of heterotopic gastric mucosa within the diverticulum, obstruction, inflammatory reaction, umbilical fistulae, and neoplasm. Most Meckel's diverticula show no evidence of a pathologic process and consequently produce no symptoms.

CASE REPORTS

Case 1—Diverticula of the Small Intestine. A 53 year old female came in with a complaint of gas, fullness and a dull aching pain in the right side of the abdomen. Physical examination was essentially negative, and the laboratory findings were negative except that on a G. I. series two diverticula were found. One was in the second portion of the duodenum, the other at the ligament of Treitz. The type of diverticulum seen at the ligament of Treitz in this case is the type that often gives trouble, that is, it has a narrow neck which favors stasis and infection within the diverticulum.

Case 2—Obstruction due to Diverticulum. This patient was an elderly female who came in with obstruction. A Miller-Abbott tube was passed to the second portion of the duodenum and some thin barium solution was instilled at this level. An inverted diverticulum was found in the second portion of the duodenum, causing obstruction by intussusception. Several other loops of small intestine were distended. This is another complication of diverticula.

Case 3—Acute Suppurative Meckel's Diverticulum causing Obstruction of the Small Intestine. The patient was a 52 year old white female who came in with a typical small bowel obstruction. She had had no bowel movement for three days. During this time her abdomen had become swollen and tender. She had not experienced any attacks like this before. X-ray examination of the abdomen by a flat plate showed distended loops of small bowel and fluid levels. The patient was

treated conservatively with Miller-Abbott tube decompression without success, so surgery was advised. At operation acute suppurative Meckel's diverticulum was found with localization and abscess formation.

TUMORS

The following is a simple classification of the more common neoplasms found in the small intestine.

Malignant	*Benign*
(a) Carcinoma	Leiomyoma
Scirrhous	Lipoma
Polypoid	Adenoma (incl. polyps)
Mucoid	Fibroma
(b) Sarcoma	Hemangioma
Lympho	Angioma

Tumors of the small bowel are seldom seen and indications are usually secondary, so that specific cytologic diagnosis can rarely be made. The location of both benign and malignant tumors is demonstrated by the following two charts submitted by Weber and Kirklin of the Mayo Clinic.

TABLE I

MALIGNANT LESIONS OF THE SMALL INTESTINE, 1907 TO 1939, INCLUSIVE (FROM MAYO)

Lesion	Duodenum	Jejunum	Ileum	Meckel's Diverticulum	Multiple	Not Specified	Total
Adenocarcinoma	23	31	21		4	1	80
Leiomyosarcoma	2	2	1	4		1	10
Other Lesions		1*	1†				2
No pathologic specimen	4	6	4			2	16
Total	29	40	27	4	4	4	108

*Epithelioma, multiple, melanotic type

†Hemangio-endothelioma

TABLE II

BENIGN LESIONS OF THE SMALL INTESTINE, 1907 TO 1939, INCLUSIVE

Lesion	Duodenum	Jejunum	Ileum	Multiple	Not Specified	Total
Adenoma	6	2	3			11
Myoma	8	4	2			14
Lipoma		2	2			4
Fibroma	1	1	2			4
Hemangioma	2		1			3
Osteochondroma					1	1
No Specimen		1	1	1	1	4
Total	17	10	11	1	2	41

According to Ewing, about 3 per cent of all gastrointestinal malignant tumors occur in the small intestine. In a series of 228 cases of cancer of the small intestine compiled by Hoffman and Polk, 45.6 per cent occurred in the duodenum and 54.4 per cent in the jejunum and ileum. For both benign and malignant tumors, the most common place of occurrence is the second portion of the duodenum, with the lower end of the ileum ranking second in point of frequency. Adenomas constitute about one-third of all benign tumors, and pancreatic rests are found about as frequently as adenomas. Horsley and Keasbey estimate that 95 per cent of benign tumors of the small intestine are of the intraluminal type.

An important associated factor in tumors of the small intestine is the development of intussusception. The involved loop of bowel may show the following roentgenologic characteristics:

1. Obstruction (small intestinal).

2. A threadlike area of barium making an exit through the lumen of the narrowed intussusception.

3. Stretching of the mucosal folds so that the distance between them appears wider.

4. A translucent area produced by the intussuscepted loop displacing the barium.

The essential roentgenologic findings in tumors of the small bowel are as follows:

1. Evidence of the obstruction with dilatation of the proximal loop.

2. An annular napkin-ring type of deformity or a translucent area within the lumen, depending upon whether the lesion is scirrhous or adenomatous.

3. Sarcomas may show an involvement of a diffuse character without obstruction.

4. Benign tumors may be recognized as an intraluminal, rounded or polypoid area within an otherwise intact small intestine. The submucosal tumors may show localized narrowing of the lumen with intact mucosal folds.

5. Tumors may produce intussusception and acute obstruction.

CASE REPORTS

Case 4—Cicatrizing Hemangioma of the Jejunum. A white, single female, aged 50 years came under the observation of a doctor in 1941. At that time a diagnosis of secondary anemia and menopausal syndrome was made. The red blood cell count was 4.2 million (at intervals it was at a lower level) and the hemoglobin was 50 per cent. Between 1941 and 1944 the patient received repeated blood transfusions for secondary anemia. At intervals x-rays of the stomach, small bowel, and colon were done, all of which were negative. In April 1944, the small bowel examination showed a persistent dilatation of the proximal jejunum with an associated partial obstruction. This was demonstrated as an intussuscepting tumor. One month after these findings surgery was advised and a sclerosing hemangioma of the jejunum was resected. The postoperative course was uneventful.

Case 5—Carcinoma of the Lower Ileum. This 45 year old single male came to the office with illness dating back four or five months, his chief complaint being soreness and fullness after eating, with some abdominal cramps. The passage of gas or emesis produced relief. X-ray examination consisted of a flat plate of the abdomen, which showed a high grade small intestinal obstruction. There were markedly distended loops of the small intestine and some of the loops measured from 8 to 10 cm. in diameter. The colon was not dilated. Miller-Abbott tube decompression was used, at which time an attempt was made to study the exact level of the obstruction without success. On March 5, 1949, a resection was done and an obstructing carcinoma 2 feet from the ileocecal valve was found with implants on the peritoneal surface of the adjacent small bowel. Microscopic picture of the tissue showed a Grade III adenocarcinoma, Type C Dukes.

REGIONAL ENTERITIS

Regional enteritis is the most common lesion of the small intestine and is generally found in the terminal ileum, although any portion of the small intestine may be involved. It is usually found in persons between twenty and forty years of age and is more often seen in women than in men. The disease causes cramping, middle abdominal pain often associated with diarrhea, fever and sometimes with a loss of weight. The wall of the intestine is thickened, fibrosed, edematous, with hypertrophy of the muscle, neutrophilic and round cell infiltration, and a small aggregation of lymphocytes which grossly resembles tubercles. A single segment of 2 or 3 inches, or multiple segments of several feet may be involved. Regional enteritis may be of the hyperplastic or nonsclerosing type.

CASE REPORTS

Case 6—Terminal ileitis with Cecal Involvement. A 37 year old malnourished white female came in with a chief complaint of loose bowels for one year, with about three to six watery movements daily. There was no blood but mucus was present in the stools. She had intermittent abdominal pain. The blood picture was normal. She was first examined radiographically by small bowel study in 1946 at which time a terminal ileitis was found. The terminal ileum was fixed, the lumen varied from 1 to 5 mm. and the mucosal pattern was abnormal. There was some questionable involvement of the mucosa of the cecum. X-ray of the chest was negative. The patient had lost 13 pounds and at this time she weighed 79 pounds. At surgery the terminal ileum was resected. The right colon was involved and it was resected also. Ileotransversostomy was performed. In 1948 the patient had a total hysterectomy. At this time she was complaining of rectal soreness and of having some diarrhea. In 1949 proctoscopic examination showed changes due to chronic ulcerative colitis. A barium enema was done and the colon was negative above the proctoscopic level except for the ileotransversostomy.

Case 7—Regional Enteritis with Progression. A white male of 30 years of age complained of loose bowels for a year or so with progressive loss of weight. His weight at this time was 100 pounds. Several abscesses were drained during the first year of his illness. In 1944, a small bowel examination showed a fixation of the terminal ileum and cecum with a disturbance of the mucosal pattern. An operation was performed with removal of the terminal ileum and cecum, and anastomosis of the remaining ileum to the colon was established. There was a recurrence demonstrated by small bowel study and another operation was performed early in 1945 at which time 62 cm. of ileum and 33 cm. of colon were removed. There was a granulomatous mass at the site of the previous ileocolostomy. The patient had a progressive course downward with numerous abscesses and fistulae. He finally died and autopsy showed regional enteritis involving the remaining jejunum. There were numerous localized peritoneal abscesses.

TUBERCULOSIS OF THE SMALL INTESTINE

Tuberculosis of the small intestine usually involves the ileum and cecum but may be present in either alone. In one report of 184 cases of tuberculosis with intestinal lesions the small intestine was involved in 6 per cent of the cases, the cecum alone in 19 per cent, and the ileum and cecum in 75 per

cent. A small, short ulcerated area may be present in the ileum which might prove extremely difficult to demonstrate unless pressure films were carefully made at the proper time. The hyperplastic form, which is rare, is characterized by a granulomatous reaction with considerable scar tissue.

CASE REPORT

Case 8—Pulmonary Tuberculosis with Tuberculous Terminal Ileitis and Typhlitis. Patient was a 33 year old male with bilateral tuberculosis. The sputum was positive and the process involved the greater portion of both upper lobes. He had been complaining of intermittent cramping pain in the right lower quadrant for about eight months, most marked in the afternoon. He had lost 12 pounds of weight in the last month. He was constipated but at the onset of his abdominal complaints he was bothered with loose bowels. He had no blood in the stools. Examination of the small bowel showed a terminal ileitis and an involvement of the distal 6 inches of the ileum. There was also a typhlitis. The terminal ileum showed decreased lumen, fixation, and tenderness, and the mucosa was ulcerated. The cecum was contracted and the mucosa of the cecum was ulcerated. The findings were confirmed by barium enema.

INTESTINAL OBSTRUCTION

The examination of the patient with intestinal obstruction should include flat plate of abdomen in the supine and prone positions. It may also be advisable to take an erect or sitting film to demonstrate the layering of fluid in the intestinal tract. In patients too ill for this, lateral recumbent positions may be employed. The roentgenographic diagnosis depends upon two factors: first, the dilatation of the small intestine and, second, the accumulation of fluid and gas. In the erect position one may be able to see fluid levels surmounted by dome-shaped bubbles throughout the distended loops of intestine. The roentgenologist may be able to differentiate between paralytic and mechanical ileus by the gas bubble in the stomach and distention of the colon. Late in the picture the findings are identical in both the mechanical and paralytic ileus. The time generally given as required before a roentgenogram may be expected to be positive in acute intestinal obstruction is one to five hours, the average being three hours.

The Miller-Abbott tube has been useful in the management of cases of intestinal obstruction, and instillation of a dilute suspension of barium sulfate through the tube may be of value in localizing the actual zone of obstruction. The Miller-Abbott tube should be passed under fluoroscopic control to the second portion of the duodenum.

CASE REPORT

Case 9—Acute Intestinal Obstruction due to Paraduodenal Internal Hernia. A 52 year old male acutely ill with distention, vomiting and abdominal pain. Symptoms began with a sudden onset of pain the previous night. Clinical manifestations were those of an acute upper intestinal mechanical obstruction. Roentgenographic examination by flat plate of the abdomen showed distended loops of small bowel. No fluid levels were present at this time, probably because upright films were not taken. It was advised that surgery be resorted to and at operation a paraduodenal internal hernia was found.

NUTRITIONAL DISTURBANCES

(a) Vitamin deficiency states have been described in the literature by Golden and others. The findings have been listed as changes in mucosal relief pattern and changes in motility. I have been unable to specifically identify vitamin deficiencies.

(b) Thayson concluded that celiac disease or intestinal infantilism of childhood, nontropical sprue or idiopathic steatorrhea of adults, and tropical sprue were very nearly related or perhaps identical and could be grouped under the term idiopathic steatorrhea.

Mackie, Snell and Camp were among the first observers to point out certain roentgenologic changes frequently seen in this group of disorders. Others have confirmed their findings.

The most striking change is an obliteration of the valvulae conniventes causing a smooth appearance of the margins of the barium filled intestine. Sausage-like masses of barium often remain stationary for a time in the loops of jejunum. This appearance has been noted most often in second and third filled loops. The presense of these smooth, dilated, barium filled, sausage-like segments is designated by Kaston as "moulage sign." After the barium has passed there are often remnants of barium adherent to the mucosa. In other bowel

TABLE III
THE DIFFERENTIATION BETWEEN CONGENITAL PANCREATIC STEATORRHEA AND CELIAC DISEASE*

	Congenital Pancreatic Steatorrhea	Celiac Disease
Time of onset of symptoms	Birth	9 mos. to 2 yrs. of age
Gross appearance of stools	Oil present (butter stools)	Oil absent
Fat in stools present as	Neutral fats	Fatty acids, soaps
Glucose tolerance curve	Normal or high	Flat
Autopsy	Lesions in pancreas	No pancreatic lesion

*From Harper, M. H.: Congenital Steatorrhea Due to Pancreatic Defect. Arch. Dis. Childhood, 3:45 (March) 1938.

loops there may be areas showing marked irregularity of the mucosal pattern of the terminal duodenum and jejunum. In idiopathic steatorrhea the markedly irregular Kerkring's folds are not seen as frequently as in the moulage appearance. Hypomotility in the small intestine is the rule, but hypermotility may be present in some of the individual loops intermittently. The changes in small intestine are most marked during acute relapse and have been previously ascribed to avitaminosis B by some, and edema and inflammatory changes by others.

CASE REPORT

Case 10—Sprue (Non-Tropical). The patient was a 36 year old female who had fatty stools by laboratory analysis. She had been treated for hypochromic anemia with liver, iron, and yeast for the past few years. She had gradually lost weight from 115 to 78 pounds. There was a diffuse osteoporosis on examination of the bony skeleton. The blood calcium was 9.6 and the blood phosphorus was 2.2 mg. per 100 cc. On examination of the small bowel, the margins of the barium filled intestine were smooth and there were dilated loops of small bowel and some hypomotility. There was an ironing out of the normal mucosal folds, especially in the duodenum and upper jejunum.

INTESTINAL PARASITES

Ascaris lumbricoides produce an elongated filling defect in the lumen of the small intestine which is filled with barium. Barium may be seen in the intestine of the worm for a number of hours.

Hookworm may cause changes in the mucosal pattern of the small intestine. Krause and Crilly described coarsening of the mucosal folds of the mid and lower jejunum in mild cases, and obliteration in severe. Yenikomshian and Shehadi have described changes in the mucosa of the duodenum which remained for some time after treatment. Hades and Keefer showed 60 per cent abnormal mucosa in 125 proved cases of ankylostomiasis.

COMMENT AND SUMMARY

The most common lesions of the small intestine of clinical significance which can be roentgenologically diagnosed are regional enteritis, neoplasms, both malignant and benign, and Meckel's diverticulum. Not infrequently the radiologist will be unable to report the nature of the lesion but may be able to demonstrate an intussusception or obstruction. Regional enteritis has the symptom complex of loose, watery stools, cramping abdominal pain, and loss of weight. The passage of bright red blood or dark blood, or the passage of blood as tarry stools may be the sign or symptom of a tumor. Roentgenologic examination by oral methods should not be attempted in acute obstruction because of danger of impaction of barium and perforation above an obstruction. The introduction of barium through a Miller-Abbott tube in small amounts may be used in certain cases, however. We do not attain the degree of diagnostic accuracy in the roentgenologic examination of the small bowel that we do in the examination of the stomach and colon.

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INDICATIONS FOR SURGICAL INTERVENTION*

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NEW ORLEANS

Obstruction, hemorrhage, and perforation are the usual indications for surgical intervention.

INTESTINAL OBSTRUCTION

The accompanying table, from Wangensteen, lists the causes of intestinal obstruction. The possibility of intestinal obstruction must be borne in mind in all cases of ill defined abdominal pain, whether intermittent or constant, especially where previous abdominal surgery has been done. The classical picture of obstruction is intermittent peristaltic pain, increasing in frequency and severity, and associated with vomiting. When these signs and symptoms are accompanied by an x-ray of the abdomen showing dilated loops of small bowel, with or without a fluid level, the diagnosis is easy. The presence of bowel sounds or the history of bowel movements does not mean that obstruction is not present. X-rays must be taken with the patient in the prone, upright, and lateral decubitus positions. Dilated loops with fluid levels are diagnostic. One should not wait for distention, vomiting, or peritonitis. Paralytic ileus usually shows uniform distention of both the small and large bowel.

The Miller-Abbott tube is of inestimable value in both the diagnosis and treatment of obstruction. The tube should be passed on all cases, at least into the stomach. A distinction should be made at this time of (1) early, and (2) late, intestinal obstruction. In early obstruction where the patient is admitted free of distention and in electrolyte balance, operation should be performed immediately. In late intestinal obstruction,

TABLE 1

CAUSES OF INTESTINAL OBSTRUCTION
WANGENSTEEN

I. Mechanical Obstruction
  A) Narrowing of lumen
    1. Stricture of intestinal wall
      (a) Congenital
      (b) Acquired
    2. Obturation
      (a) Gall-stones
      (b) Ascaris
      (c) Other foreign bodies
    3. Compression from without
  B) Intestinal obstruction due to adhesions and bands
  C) Hernia
    1. External
    2. Internal
  D) Volvulus
  E) Intussusception
  F) Developmental errors
II. Intestinal obstruction due to nervous imbalance.
  A) Inhibition (paralytic) ileus
  B) Spastic or dynamic obstruction
III. Vascular obstruction.
  A) Dut to mesenteric thrombosis and embolism

the mortality of immediate surgical intervention is prohibitive. Time must be taken to decompress the abdomen and to permit the restoration of fluid and electrolyte balance. Without previous decompression, the surgeon is faced with the enormous task of trying to locate an obstruction or close the abdomen in the face of greatly distended coils of intestine.

Hendricks and Griffin stressed the two types of intestinal obstruction, high and low. In the high type of obstruction, emesis is profuse, and there is a marked loss of fluid. This type of patient responds well to intravenous fluids, and intestinal decompression with the Miller-Abbott or Levin tube. In the low type of obstruction, vomting will be late, distention will be more marked, and there will be severe local effects on the obstructed bowel. In their series of cases, low bowel obstruction was located in the terminal ileum in 89.4 per cent of the cases.

It may be well to stress again the features which aid in the diagnosis of intestinal obstruction. The three common complaints are pain, vomiting, and distention.

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The pain is described as colicky, abrupt in onset, and usually located about the umbilicus. There is often complete relief of pain between bouts of colic. The colic is usually synchronous with borborygmus either audible to the patient or apparent on auscultation. Later on, of course, peristalsis may be absent as a result of the distention and paralysis of the bowel.

Severe abdominal pain and shock frequently accompany the onset of a sudden volvulus or internal herniation. Some of these patients are comparatively free of symptoms and signs after the initial severe pain. A flat x-ray taken on admission usually reveals a hairpin or horseshoe type of dilatation, indicative of a closed loop type of obstruction.

Intussusception in adults is usually secondary to tumor or Meckel's diverticulum. However, in children, an etiological factor can be found in only 5 per cent of cases. The diagnosis is suggested by paroxysmal attacks of abdominal pain and vomiting, alternating with intervals free of pain; a mass palpable either abdominally or rectally; bloody stools; and often a characteristic x-ray picture. Barium enema is not only of diagnostic value, but may be used therapeutically to reduce ileocolic intussusception. Ravitch has recently called attention to the older work of Hipsley, of Australia, in the use of the barium enema in the reduction of intussusception. Ravitch reported 27 cases of intussusception treated by barium enema, of which 20 had complete reduction by enema alone. All survived. This mortality is so far superior to that of the surgical treatment of intussusception that it should be tried in all cases although adequate preparation for surgical intervention should be made in case the reduction by barium enema fails. Ravitch called attention to the fact that if the barium enema is given at a height of 3 feet, one can not rupture the bowel nor can one reduce a gangrenous bowel. As for the rate of recurrence, the incidence is 2 per cent both after surgery and after barium enema reduction. Should reduction fail after three rapid attempts by barium enema, the patient can be taken immediately to the operating room, and reduction performed surgically. If reduction is incomplete or if there is any question as to whether or not reduction has been successful, a small McBurney incsion will verify completeness of reduction. The incidence of tumors as a cause of intussusception of the bowel is so small in children that this need not be considered in the treatment.

Rives, Strug, and Essrig, have described two distinct clinical types of mesenteric vascular occlusion: (1) An acute type resulting from sudden blockage of a major mesenteric artery. The history here is that of a patient suffering from severe cardiac disease who suddenly presents the picture of a major abdominal catastrophe: severe abdominal pain, usually cramplike; severe nausea and vomiting; and profound shock. All signs of peristalsis soon disappear. (2) A gradual type due to venous occlusion or a slowly developing arterial thrombosis, which passes from the stage of mild colicky pains thru that of partial intestinal obstruction to that of intestinal strangulation over a period of days. The x-ray shows an ileus of varying grade and the colon contains a normal amount of feces and gas. They stress the following aids in diagnosis: (1) A previous cardiac history; (2) the early disappearance of peristalsis in a case of suspected intestinal obstruction; (3) the constant occurrence of a high white blood count; and (4) the development of shock. Treatment is of course surgical. Intervention should be prompt and radical resection of the bowel is necessary, where gangrene has developed. The mortality in this type of case is obviously very high.

A knowledge of physiology is of utmost importance to the surgeon. Cogswell, in a report of massive resection of the small bowel calls attention to the fact that the amount of bowel removed is of less importance than the amount left behind to carry on absorption and digestion to maintain nutrition. The length of the small bowel may vary from 10 feet to 28 feet, 4 inches, in adults. Haymond reported that resection of 33 per cent of the small bowel could be

done with expectation that the digestive tract would return to normal function, giving 50 per cent as the upper limit of safety. In the case that Cogswell reported, 80 per cent resection was done in a case of superior mesenteric artery thrombosis with survival. In this patient only 14 inches of jejunum were left. Postoperatively, the patient had poor fat digestion with frequent fatty stools, associated with a low cholesterol, and deficient calcium absorption. Carbohydrates and proteins were well metabolized. There was good response postoperatively to a high protein, high carbohydrate, low fat diet, augmented by oral calcium and vitamin D. After resection of the small bowel, compensation takes place by an increase in the diameter of the remaining bowel to almost twice its normal size. There is no increase in the length. West showed that when all but 3 feet of the small bowel were resected in man, carbohydrates were utilized normally, but only 75 per cent of the proteins were used, and but 55 per cent of the fats. When a high fat diet was then given, the patient developed a negative calcium balance manifested by tetany and a low blood calcium. Inadequate compensatory changes following massive resections of the small bowel result in a loss of weight, anemia, diarrhea, tetany, weakness, and possibly vitamin deficiencies.

REGIONAL ENTERITIS

A word now of the treatment of regional enteritis. The condition is characterized by cramplike pain, diarrhea, anemia, malnutrition, and draining fistulae. The diagnosis should be suspected in any case with tenderness in the right lower quadrant with or without a palpable mass, fever, or fistulae. The diagnosis of regional enteritis must be considered in all patients with symptoms of acute appendicitis, ulcerative colitis, or intestinal obstruction. In an acute case where the diagnosis has not been established before operation, and where at operation the characteristic findings of a reddened serosa of the bowel with thickening of all the coats, plus a marked thickening of the mesentery with an enlargement of the lymph nodes is found, it is probably wiser to do nothing. Removal of the appendix at this time may result in a fistula if the cecum is involved, and it is well known that often at a second operation, no trace of the initial lesion has been found. In chronic cases, no surgical intervention is required if the symptoms are mild, if there are no fistulae, and if there is no evidence of intestinal obstruction. According to Crile, operation is indicated only when the symptoms are severe and intractable, or when there is evidence of obstruction or fistulae. Here, side-to-side anastomosis without exclusion of the diseased segment rarely gives a long standing remission of symptoms. However, anastomosis with division of the bowel and exclusion of the involved segment usually results in a remission. This procedure is much safer than resection and certainly as sound from a medical point of view since complete removal of a diseased portion of bowel has not prevented appearance of the disease in other areas. Colp has called attention to the value of doing an ileo-transverse colostomy with exclusion because then, if extension or recurrence takes place proximally, the diseased bowel can be excluded by a second ileal division about 60 cm. proximal to the last physical evidence of disease, provided that sufficient small intestine remains for adequate nutrition. In his opinion, the objections to primary enterocolostomy with exclusion are not valid, since he has never seen a case where the distal divided ileum has blown out because of obstruction in the diseased bowel. Here again, he calls attention to the value of the Miller-Abbott tube, not only for its value in decompressing the small bowel, but because the position of the tip of the tube is of great value in differentiating the distal from the proximal bowel in a mass of matted and strictured bowel.

TUBERCULOSIS

Tuberculosis of the small bowel may be dismissed with a short comment. Ralph Adams has stated that "as a matter of principle, operation for intestinal tuberculosis should not be undertaken when there is an active pulmonary infection, except when mandatory because of obstruction, internal

perforation, or likelihood of carcinoma." Resection should not be done unless the diagnosis of malignancy cannot be excluded, and the operation of choice is an ileocolostomy with division and exclusion of the ileum.

TUMORS

The symptoms of mild abdominal cramps and intermittent rectal bleeding should arouse suspicion of the possibility of a tumor in the small intestine. Cattell and Colcock divided these tumors into two groups: (1) The largest, and the one which included most of the benign tumors, is one in which the direction of the growth was toward the lumen. Here, the symptoms of obstruction appeared fairly early. (2) In the smaller of the two groups, but unfortunately, the one which contained most of the malignant tumors, the direction of growth was away from the lumen. In these, diagnosis was not made until late because symptoms of obstruction and bleeding appeared much later. McDougal gave a five year overall survival rate of 5 per cent for tumors of the small bowel. Crile gave the occurrence of malignant tumors of the small intestine as 3 per cent of malignant tumors of the gastrointestinal tract. The surgical treatment of these tumors is quite obvious,—resection of the tumor with the involved mesentery. The uniform prognosis is poor except in carcinoid of the ileum. Stewart recently called attention to a new use of the Miller-Abbott tube in the diagnosis of tumors of the small intestine. He had a patient who had had two previous severe hemorrhages and in whom x-ray examination and exploratory laparotomy failed to reveal the lesion. A Miller-Abbott tube was passed into the stomach and, under fluoroscopic control, passed into the duodenum, and then allowed to advance 6 inches every hour. At the end of every hour, a sample of the intestinal contents was taken. When dark blood was obtained, an x-ray was taken, and operation was performed using the position of the Miller-Abbott tube to indicate the tumor of the jejunum which was found to be a leiomyoma. He calls attention to the fact that this procedure is not free of danger, and that blood must be available in case of an untoward hemorrhage.

LESIONS OF THE SMALL BOWEL IN CHILDREN

No discussion of surgery of the small bowel can be considered complete without some mention of the special problem which children present. The accompanying table lists some of the conditions whch should be looked for. Embryologically, the events

TABLE 2
PEDIATRIC PROBLEMS

1. Congenital Atresias and Stenoses
2. Malrotations
   A. Association with Volvulus of Small Bowel
3. Meckel's Diverticulum
4. Duplications of Alimentary Tract
5. Meconium Ileus—Celiac Disease

which take place between the fifth and tenth weeks of fetal life are responsible for the cases of congenital atresia and stenosis of the intestine. Prior to the fifth week, the intestine presents a well defined lumen lined with epithelium. After this, the epithelium proliferates and the lumen from the pylorus to the ileocecal valve is obliterated. Subsequently vacuoles appear among epithelial cells, and by the twelfth week, the lumen is reformed. Persistence of the septum gives atresia. A partially perforated septum causes stenosis. Similarly, arrest in development during the tenth or eleventh week of fetal life may result in: (1) An incompletely rotated cecum, and (2) a lack of attachment of the mesentery along the posterior abdominal wall. When incomplete rotation of the cecum occurs, the cecum is found just below the distal half of the stomach with bands of reflected peritoneum running from it to the right posterolateral part of the abdominal wall. These bands lie across the descending portion of the duodenum, or the cecum itself may lie over the duodenum causing obstruction. In these cases the mesentery of the small bowel lacks normal fixation, so that it has only a short rudimentary attachment just below the origin of the superior mesenteric artery. Because of this, a volvulus to 360° or more in a clockwise direction may result. Symptoms from these cases occur in half the patients

during the first three weeks of life; and in the other half, may appear at a much later age. From the surgical point of view, it is not enough to relieve the volvulus of the small bowel, but the band obstructing the duodenum must be found and cut or else surgery will be incomplete.

Donovan, in an article on "Gross Intestinal Hemorrhage in Children," lists the following causes of hemorrhage in the order of their importance:

1. Meckel's diverticulum, containing gastric mucosa with ulceration.
2. Duplication of the small intestine, which frequently contains gastric mucous membrane with ulceration, and which is most common in the terminal ileum.
3. Polyp of colon.
4. Duodenal ulcer.

Meckel's diverticulum which represents a portion of the vitelline duct which has opened into the ileum 18 inches to 3 feet above the ileocecal valve may call for surgical intervention because of anyone of the following complications:

1. Hemorrhage.
2. It may be the leading point of an intussusception.
3. It may become inflamed.
4. It may cause obstruction.
5. Three may be volvulus and infarction of the diverticulum.

Duplications of the alimentary tract may give rise to symptoms from dilatation which causes obstruction, or from pain caused by distention of the duplication. Again, from a surgical point of view, it is important to remember that the blood supply to the associated normal bowel is intimately bound up with that of the duplication, and it is dangerous to attempt to remove the duplication alone. The entire portion of bowel must be resected.

Ascariasis is not an uncommon cause of intestinal obstruction in children. About one year ago, we saw 4 members of the same family, ages, 1, 2, 3, and 4, all acutely obstructed from round worms. The 3 year old patient was in shock on admission, and died within five minutes. The other 3 recovered after surgical intervention consisting of enterotomy in 2 cases, and resection of a gangrenous loop, which had been twisted through 360°, in the one year old patient, with subsequent end-to-end anastomosis. In the 2 year old patient, the ileum in its lower third was packed with ascaris, and 129 adult worms making up a mass of 3/4 of a liter were removed at operation.

Until the paper of Hiatt and Wilson, in 1948, no case of meconium ileus had recovered. They report 8 cases with 5 recoveries. In 5 of the 8 cases, there was associated volvulus. They believe with Farber that changes in the pancreas are primary and that lack of trypsin results in an abnormal type of meconium which is so sticky that the bowel can not propel it, resulting in intestinal obstruction. One often gets a familial history since this is apt to have occurred in other members of the same family; a story of failure to pass meconium, vomiting of green material, distention, and an empty rectum. Lipiodol used as an enema is of aid in establishing the diagnosis. Treatment consists of a very short period of hydration and intubation followed by early surgical intervention. Proper surgery consists of choosing an enterotomy site just proximal to the atrophic terminal segment of ileum which is filled with meconium concretions. A catheter is inserted and saline injected under tension to permit a flushing out of the concretions. Any devitalized gut must be resected. Volvulus is a frequent complication. Postoperative care consists of a low fat, high protein diet, along with oral pancreatin daily. Neuhauser offered as an additional aid to diagnosis of this condition the finding of small gas bubbles in a medium of water density distal to the main column of gas in the small gut.

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SURGICAL TREATMENT OF PEPTIC ULCER, INCLUDING GASTRECTOMY AND VAGUS NERVE SECTION

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Within the present decade, medical scientific advance has been exceptionally rapid. The work on many new or revived procedures by our great university medical centers places these procedures at our disposal within a much shorter time than heretofore. The fact that divergence of opinion as to the merits of the experimental work or clinical results exists, is a healthy state, and will continue as long as we make progress. There comes a time, however, when the clinician in outlying echelons must determine for himself, by application, the value of advanced methods. In so doing, he can better judge for himself in those instances where divergent opinions exist.

At this time, therefore, I would like to discuss briefly my limited experience with one of the current recommended surgical procedures for the treatment for peptic ulcer. The number of articles reviewed is not large, but they have been chosen with a conscientious desire to present the subject fairly. The question of choice of proper surgical procedure for gastric ulcer will not be discussed since there seems to be a unanimity of opinion that when the condition of the patient permits, gastric resection should be done. This, of course, is due to the fact that a fairly high percentage of ulcers either are, or become malignant.

For the purpose of comparative study, I have outlined four tables:

Table No. I. Shows the result of treatment of duodenal ulcer by gastroenterostomy alone.

Table No. II. Shows the result of treatment of duodenal ulcer by subtotal gastrectomy.

Table No. III. Shows vagotomy alone.

Table No. IV. Shows treatment by gastroenterostomy with vagotomy.

TABLE I

GASTROENTEROSTOMY

	Author	No. Cases	% Mort.	% Well	% Recur. or Pers.
1.	Gardner	68	7.3	88.8	5.6
2.	Cooper	279	3.2	83.7	16.3

TABLE II

GASTRIC RESECTION

	Author	No. Cases	% Mort.	% Well	% Recur. or Pers.
1.	Gardner	123	8.9	84	5.0
4.	Bartels	221	4.5	86.4	1.8
5.	St. John	184			
		(-45)	1.0		
		210			
		(-45)	7.6	85	2.5
8.	Snelling	*8	0	100	0
			*12	88	

TABLE III

VAGOTOMY

	Author	No. Cases	% Mort.	% Well	% Recur. or Pers.
1.	Gardner	77	1.3	80.5	2.6
2.	Colp	20	0	*40	15.0
6.	Dragstedt	96	.2	93.5	3.0
7.	Sanders	*50	0	94	6
8.	Snelling	9	0	100	0
9.	Cole	15	0	93.4	6.6

TABLE IV

VAGOTOMY WITH GASTROENTEROSTOMY

	Author	No. Cases	% Mort.	% Well	% Recur. or Pers.
2.	Colp	26	3.8	65	7.6
6.	Dragstedt	64	0	100	0
8.	Snelling	5	0	100	0
9.	Cole	60	1.6	98.4	0

There are other pertinent facts, which are not noted in the statistical study in the tables just given, such as (1) nonfatal postoperative complications, (2) reoperation for continued distention, (3) complications based on surgical approach, (4) late disabling symptoms, (5) late secondary effects, and many others. Briefly, let us consider some of these.

In gastrectomy, we encounter a comparatively large number of nonfatal, postopera-

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tive complications such as those noted by St. John.[5] Some of those more frequently occurring are as follows: (1) pneumonia, (2) excessive vomiting, (3) spasm or obstruction of efferent or afferent loop, (4) biliary fistula, (5) diarrhea, (6) gastrointestinal hemorrhage, and (7) wound infection. Any of these or other complications may occur in any of the other precedures under discussion, but the comparative technical ease of their accomplishment in itself tends to lessen the incidence.

In a recent meticulous study of twenty patients who had undergone gastrectomy, Aldesberg and Hammerschlag have classified postgastrectomy syndrome into "early" and "late" postprandial symptoms. The early symptoms were: (1) epigastric pressure, (2) nausea and fullness, (3) eructation and belching, (4) dizziness, and (5) occasional vomiting. These symptoms could be observed during eating, immediately after the meal, or after a short interval. The late symptoms occurring usually in the second or third hour after meals were: (1) headache, (2) fatigue, (3) weakness, (4) perspiration, (5) palpitation, (6) dizziness, (7) shortness of breath, and (8) occasional precardial pressure.

The early symptoms are attributed to mechanical factors: distention and rapid emptying of the stomach (small), and overflooding of the small intestine. Gastritis of the stump as well as jejunitis may be predisposing factors. The late symptoms are attributed to chemical factors: hypoglycemia secondary to the exaggerated postprandial hyperglycemia. There is, of course, the possibility of increased sensitivity to insulin.

A number of surgeons[12, 13] recently have called attention to the fact that the mechanical factors controlling the early symptoms of the postgastrectomy state can be modified with benefit by using the Hopmeister-Finsterer technic.

At present, however, while it is a well accepted fact that the mortality rate for gastric resection is low, that marginal ulcers occur very infrequently, and that the Hopmeister-Finsterer type of operation will probably modify untoward symptoms of the postgastrectomy state, there still remain, according to varying statistics, anywhere from 6 to 38 per cent of patients who have had gastrectomy, who have unfavorable sequelae.

Nonfatal postoperative complications of vagotomy alone or vagotomy with gastroenterostomy are few.[1, 2, 6, 7, 9]

We are all impressed, I am sure, with the fact that the mortality rate for subtotal gastric resection is constantly being lowered, and there is no doubt that with the proper choice and handling, all of us may approach the accomplishment of the record shown in two series of cases recently reported by Bartels[4] and Gaviser[10].

In these reports, as many others, however, it is noted that the mortality rate is distinctly higher in the older age group, particularly in those 45 to 50 and over.

CASE REPORT

One case in my series is worthy of special comment:

P. Q. R., a white male, age 72. Preoperative study showed an obstructive lesion at the pylorus or first part of the duodenum. Nutrition by mouth was unsatisfactory, but by parenteral means, blood, glucose and amino acids were given so that the condition of the patient seemed satisfactory for surgery. On opening the abdomen and inspecting the area involved, it was not possible, because of the great amount of old inflammatory reaction at the pyloric end of the stomach, and the duodenum with the distorted anatomy of the surrounding structures, to tell whether the ulcer was situated on the stomach or duodenal side. In an effort to clearly ascertain this point, injury to the gastric vein occurred, and in controlling the hemorrhage, the portal structures were injured.

I am clearly of the opinion, that we should have relied on x-ray findings together with the apparent gross pathology, and should have done either a posterior gastroenterostomy with vagotomy, or partial gastrectomy with secondary removal of the pyloric antrum.

SUMMARY

1. The ideal single surgical procedure for the cure of duodenal ulcer has not yet been clearly demonstrated.

2. Subtotal gastrectomy is an excellent procedure, but is not always adaptable to the older age group.

3. Gastroenterostomy alone is not a procedure of choice.

4. Vagotomy with posterior gastroenterostomy appears to have a definite value in a limited number of cases.

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DISCUSSION

Dr. Donovan Browne (New Orleans): We have been privileged to hear one of the best prepared and executed symposiums on the small bowel that I have ever heard. You have heard it said that an institution is as strong as its pathological department; I think that might be extended to the individual, too.

I can't help but extend special congratulations to Dr. Bill Harris for giving us the news behind the news in administering a degree of spectacularness to his presentation.

Dr. Weinberger commented on and called our attention to the psychoneurotic who comes to us with a deficient state. This might well be stressed because it is most disconcerting to find your psychoneurotic patient on the autopsy table. These patients may be psychoneurotic, but they are subject to disease also and by the time they get to you and me, probably they have developed some such state as Dr. Weinberger has mentioned. It becomes not a problem principally for the psychiatrist, but evolves itself into a problem of careful cooperation between the neuropsychiatrist and the internist because you are dealing then not only with the neurosis or psychoneurosis but with the combination, and the treatment of one is not complete without proper attention to the other. The nutritional states must be attended to and the psychiatrist must follow through with rehabilitation and correction, if possible, of the fundamental disturbances.

Dr. Watt made one comment I was very much interested in that amebiasis may exist without symptoms. It is true that this infection is rather widespread and comparatively 14 per cent of the population is infected; but it is interesting to note in the carefully followed up group in a gastrointestinal survey that 38 to 40 per cent of the patients with this infection had no symptomatology, and there is a tendency when this infection is found to make all things revolve around it, and every complaint the individual has is accounted for on that basis.

I think we should be very careful of that, and there's a word of caution in that these very few completed cases constitute only about 2 per cent of the patients. They make the headlines and a campaign of fear and fright is instituted.

A few years ago agglutinations were used as a criterion to find if there was an infection. We know now that's not true and we know there are a great number of patients carrying this infection. We are not dealing always with the infection you find in the bowel as an ideological factor for the symptoms the patient presents, and to get off on a tangent, I think that deserves a little caution as we go along.

Finally, Dr. Snelling. I want to make one comment. I don't think I know all the anatomy, and I am quite sure I don't know the physiology involved in vagotomy and yet we are in a nebulous state with this procedure. That it's not the answer to the peptic ulcer problem has been freely admitted. Probably by such careful studies and following up as you have seen here, we may arrive at a decent criterion for its application at the present time. We have declared a moratorium on it.

It's interesting, here, that results with gastric resection are equally as good as those with vagotomy and a combination of vagotomy and enterostomy. I am sorry we haven't had as good results as have been rendered here. There are complications and distention of the abdomen and disturbances in the lower gut. You are familiar with these from the literature, and I would give a word of caution in the adoption of this procedure by the surgeon. It should be as you have seen presented here, a careful selection of cases made and a proper follow-up, and probably that would help us to find a little better occasion for using it.

For example, I understand that someone said vagotomy is not advocated in gastric ulcers because of the possibility of malignancy and a number of his cases have come back with a malignant

ulcer or which maybe was malignant in the beginning. I don't think vagotomy as presented up to the present time is a substitute or does away with a properly done gastric resection.

Dr. Joe E. Heard (Shreveport): Having been at this game for a long time, I have had the opportunity to watch the development of gastric surgery. In the first place, we should distinguish between gastric ulcer and duodenal ulcer. As far as I am concerned, we have little to offer the gastric ulcer, except gastric resection. I have seen these cases get into trouble elsewhere, because resection was not done and they later turned up with gastric cancer. In the old days gastroenterostomy was the method of choice for gastric and duodenal ulcers. American surgeons were quick to accept gastric resection for gastric ulcers and later included the same procedure for the duodenal ulcer. We still use gastroenterostomy in certain selected cases, although this procedure is more or less obsolete. The old patient with a duodenal obstruction, a poor surgical risk, and a low acidity, is still a good one for gastroenterostomy. Now, that vagotomy has been developed, it would seem to me that such a procedure, combined with gastroenterostomy, is still worth serious consideration in the older patients who are poor surgical risks. One trouble with the present status of vagotomy is that it has not been in use long enough and not enough cases have been done to properly evaluate it. I feel that this procedure may be well worthwhile on the selected case.

A gastric ulcer to me nearly always means gastric resection. Even with the ulcer in the surgeon's hands, it is impossible to tell at times whether it is malignant or benign. It has been definitely shown that gastric ulcers have been cured clinically and radiologically and later a cancer would develop at the same site. Had this ulcer been resected when first discovered, it is almost sure that this case would have been a cure.

In the procedure of gastrectomy, and I mean here when using the term partial, we use the Hoffmeister technic. The results have been excellent. Vagotomy alone for ulcer, from what I have seen of it and what many prominent surgeons feel about it, is not the procedure of choice. It should be combined with gastroenterostomy. It is a rather simple procedure to clip the vagus nerve from the abdominal side. This, combined with gastroenterostomy in old people with a low acidity, is a procedure worth considering. The mortality in this group is definitely higher for partial gastrectomy, whereas with vagotomy, and gastroenterostomy the mortality is practically nil. As we all know, there has been a wave of hysteria over nerve cutting operations, and it has been carried to the extreme. A moratorium which was suggested by one of our leading surgeons, is certainly the proper thing. I enjoyed Dr. Snelling's presentation and feel that this procedure, combined with gastroenterostomy is worthwhile in carefully selected patients, and gives more time to study the results and more cases better to evaluate this procedure.

Dr. J. G. Snelling (Monroe): I would like to have a minute to bring out one point in my paper. I stated very clearly that I am in accord with Dr. Heard and the rest of the discussants that gastrectomy is the procedure of choice for gastric ulcers. I really feel that vagotomy with gastroenterostomy will prevent the stagnation and generation of organic acids which produce the diarrhea and uncomfortable symptoms. If the procedures are combined, it will be a procedure which one could consider and use particularly in the old age group.

Definitely, I don't feel that it's a panacea or utopia.

Dr. Murrel H. Kaplan (New Orleans): The only question that comes to my mind in the case of vagotomy as we have seen a bit of it in New Orleans, is the question whether the disease is worse than the cure. In other words, you tell us you have a hundred per cent cure as far as the ulcer is concerned. We would like to know what percentage of your patients have untoward symptoms and the duration of these?

Dr. Snelling (In Conclusion): I stated that my experience has been limited. I don't think a man could speak with authority on the basis of 15 or 20 cases. I did show the review of literature of some excellent men, and I reviewed those series very carefully and the figures are shown. Actually there are untoward symptoms that follow gastrectomy. There are the early symptoms and the late symptoms. I think you gastroenterologists know that. They aren't completely comfortable. If you review the subject it will run from 6 to 38 per cent and they are just as uncomfortable as those having untoward symptoms following vagotomy. I couldn't speak with authority on that number of cases. If the procedure is combined and properly done the untoward symptoms will be minimum and no greater than they are with gastrectomy. If you have a procedure which entails quite a bit more of surgery, particularly when you try to apply it to the old age group, you might well consider the choice of an alternative procedure.

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ABDOMINAL EMERGENCIES IN INFANCY AND CHILDHOOD

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This paper on abdominal emergencies is intended to portray only the informative and troublesome cases which I have seen in

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private practice in the three years since my discharge from the service. It does not include abdominal trauma, tumors, or poisoning.

In our approach to the diagnosis of abdominal emergencies only a few of the many diagnostic leads available will be considered. They are: first, abdominal pain, tenderness and rigidity associated with infections; second, hemorrhage; and third, obstruction.

ABDOMINAL PAIN

When the presenting complaint is abdominal pain, an attempt is first made to exclude all extra-abdominal causes then to approach the abdomen last.

EXTRA-ABDOMINAL CAUSES

Common causes have been upper respiratory infection, pneumonia, pleurisy, pyuria, acidosis, and allergic states. Less common causes have been gastroenteritis associated with measles, crystalluria, and central nervous system disease, especially poliomyelitis.

The severe colicky pain of crystalluria closely resembles that of intussusception. There is also an absence of tenderness and rigidity. While not all are of an emergency nature, two instances occurred which required immediate intervention by a urologist.

The abdominal pain associated with poliomyelitis should be mentioned because 5 children with this disease were seen this past year; each because of abdominal pain as the presenting symptom. Two were physicians' children. Since all had an inflamed throat and 1 a pneumonia, in addition, I can only speculate as to whether the pain was caused by the respiratory infection or by the poliomyelitis. This is pointed out to stress the value of excluding extra-abdominal causes of pain before the abdomen is approached.

INTRA-ABDOMINAL CAUSES

As we approach the abdomen the predominant thought is, "Is this a surgical emergency?" and infection and obstruction come to the front. But another condition which must be differentiated from infection, especially from appendicitis, is the abdominal pain and tenderness of mesenteric adenitis accompanying an upper respiratory infection. It is this latter condition which causes more difficulty in diagnosis than anything else in my practice. After years of trying to formulate a satisfactory differential diagnosis between mesenteric adenitis (so-called tonsillitis of the abdomen) and appendicitis, I find the subject just as cloudy whenever the problem presents itself. If pain and tenderness are present in the other quadrants of the abdomen the problem is simple; if, however, the pain and tenderness are localized in the right lower quadrant, which is so commonly the case, I find it very comforting to share the responsibility with a surgeon. Since vomiting, pain, tenderness, voluntary rigidity, fever, and leukocytosis, as well as an inflamed throat are often present in both conditions, we usually observe the patient for a day; remembering, of course, that appendicitis may also be a complication of an upper respiratory infection. When a reasonable doubt exists we feel it safer to explore.

Another condition with pain and tenderness in the right lower quadrant is acute catarrhal jaundice, which in the absence of an epidemic, is easily missed if the patient is seen under artificial lights and one fails to ask the color of the stools and urine.

Inflammatory lesions of Meckel's diverticulum simulate apendicitis so closely that a differentiation is seldom possible. Periumbilical pain, nausea, vomiting, fever, and leukocytosis are common to both. However, in diverticulitis there is usually no shifting of pain or maximal tenderness to the right lower quadrant as in appendicitis. Since the treatment is the same it little matters whether the proper diagnosis is made preoperatively. What is important, however, is that a Meckel's diverticulitis should be searched for if the appendix cannot be incriminated at operation. One such case occurred at our hospital last year, though I did not see the patient.

The pain of acute general peritonitis is constant, severe, and accompanied usually by a boardlike involuntary rigidity.

The pain of intussusception, the most common cause of acquired obstruction in infancy and childhood, is sudden, sharp, severe, and recurring, accompanied by vomiting and shock, early. Tenderness and rigidity are usually not present in the first forty-eight hours, but do occur when peritonitis begins.

HEMORRHAGE

Hemorrhage from the gastrointestinal tract which has constituted an emergency has been from intussusception, hemorrhagic disease of the new-born, Banti's disease with bleeding esophageal varices, and ulceration of Meckel's diverticulum with marked hemorrhage from the bowel. The latter two instances are briefly described:

L. C., an eight year old white female, was seen for the first time practically exsanguinated. Blood transfusions and the removal of a huge spleen were life-saving measures. For the following six months there was marked improvement, when again severe hemorrhage required repeated blood transfusions. She is now receiving injections of the esophageal varices and her condition has improved.

B. J., an eleven year old white male, developed colicky abdominal pain without nausea or vomiting. Numerous bloody mucus stools had occurred in the twelve hours since the onset. Physical examination was essentially negative except for a vague tenderness about the umbilicus. The outstanding sign was the large amount of blood, clotted and unclotted, which literally poured from the rectum. It was felt we were confronted with a bleeding Meckel's diverticulum rather than an intusssusception in view of the lack of shock, vomiting or abdominal mass. At operation, a bleeding Meckel's diverticulum was resected with uneventful recovery.

Hemorrhage from a diverticulum arises from a small peptic ulcer at the neck of the diverticulum or in the adjoining intestine due to the action of acid and pepsin secreted from aberrant gastric mucosa lining the diverticulum.

OBSTRUCTIONS

Pyloric Obstruction: Three cases of congenital hypertrophic pyloric stenosis were seen. One which presented unusual diagnostic difficulties was:

E. W., a one month old male, referred to me for possible intestinal obstruction because of repeated vomiting, constipation, and fever. The temperature was 103.6° F. The neck and back were very rigid, the reflexes hyperactive, the eyes widely dilated, the abdomen greatly distended with peristaltic sounds absent. A lumbar puncture revealed normal fluid. Then it was learned that one drop of 1 per cent atropine had been given prior to each feeding for the past two days. After combating the abdominal distention, peristaltic waves and projectile vomiting were observed and a pyloric tumor easily palpated.

INTESTINAL OBSTRUCTION

A. Acquired: With the exception of an incarcerated inguinal hernia in a four and one-half month old infant, intussusception was the only type of acute obstruction observed. We are all familiar with the sudden stormy onset with severe intermittent colicky pain, shock, and vomiting; the palpation of a sausage-shaped tumor and the passage of bloody mucus from the bowel.

The 3 cases of intussusception observed were informative from several angles: All were males; the ages five, eight and ten years. This is in contrast to the usual quoted incidence that 80 per cent occur in the first two years of life. A Meckel's diverticulum served as the initiating point of the intussusception in 2 instances. Six similar complications of Meckel's diverticulum, 1 being a case of Dr. Socola's, were reported during my happy days here in New Orleans some years ago.[1]

That one cannot rely on any single sign in the diagnosis of intussusception, such as bloody mucus from the rectum, or a palpable mass, is well illustrated in the ten year old boy. No bloody mucus was passed during a forty-eight hour period of observation and even the chemical test for blood was negative on mucus obtained from the rectum. In addition, a mass was never palpated.

B. Congenital: Congenital obstruction of the bowel is relatively rare but important. About a third of the lesions are found in the duodenum at or near the ampulla of Vater, next at the duodenojejunal junction, and after that the location of the vittiline duct. After a general consideration, we shall discuss the differential diagnosis of duodenal obstruction, then present a case report of congenital duodenal atresia successfully treated by duodenojejunostomy.

The causes of congenital obstruction may be due to a defect in the normal development of the lumen, such as failure of

canalization, or to persistence of the anal membrane, or to meconium ileus; or the obstruction may be due to some extrinsic factor such as pressure produced by tumors, hernias, peritoneal bands, and congenital volvulus. The lumen may be partially or totally occluded.

DUODENAL OBSTRUCTION

When the obstruction is in the duodenum, vomiting is the most prominent symptom and begins at once and is persistent. The vomitus contains bile if the obstruction is below the ampulla of Vater—the usual condition. In addition to the rapid loss of weight, dehydration and constipation, abdominal distention and visible peristaltic waves are often present.

Conditions other than pressure by tumors, hernias, peritoneal bands, and congenital volvulus to be excluded are tracheoesophageal fistula, pyloric obstruction, meconium ileus, and imperforate anus.

In tracheoesophageal fistula—the usual type—vomiting, choking, and cyanosis occur immediately after swallowing. Other signs are a constant drooling from the dependent corner of the mouth and a fullness of the epigastrium in contrast to a sunken appearance of the lower abdomen. I mention this latter sign because the case of duodenal atresia presented below also had the fullness in the epigastrium with a sunken appearance of the lower abdomen.

Pyloric obstruction, whether stenosis or spasm, usually does not show symptoms before the tenth day of life nor does the vomitus contain bile.

Meconium ileus, an obstruction due to the dried putty-like meconium, should be suspected in the vomiting infant who has failed to pass a stool.

Imperforate anus is easily excluded by the early distention, late vomiting, absence of stools and, of course, a rectal examination (a).

CASE REPORT

A fullterm Latin-American female, weighing 7 pounds, five ounces, was seen on consultation at the local Air Base Hospital on the third day of life because of repeated projectile vomiting of bile-stained material since birth. A meconium stool had been passed on the first and second days of life. Physical examination revealed upper abdominal distention with a sunken appearance of the lower abdomen. Peristaltic sounds were absent. Rectal examination was negative. Clinical impression was atresia of the duodenum distal to the ampulla of Vater.

While preparing the patient for surgery the following tests were done:

1. A flat plate of the abdomen was taken which revealed air in the stomach and a portion of the duodenum. A small amount of air in the descending colon was considered to have been introduced by the examining finger or rectal tube.

2. Umbrathor*, an aqueous solution of thorium dioxide, was mixed with equal parts of water and 10 cc. of the mixture introduced through an inlying stomach tube. X-rays then confirmed the clinical impression of duodenal atresia. This radio-opaque material is without danger and, we believe, is superior to barium. It may, if desired, be aspirated easily and completely at the termination of the x-ray studies and does not have the added possible danger associated with the use of barium of subsequently obstructing the intestinal tract.

3. Farber's test for the presence of keratinized epithelial cells in the meconium was not helpful in establishing the diagnosis. In atresia, keratinized epithelial cells are said not to be present. The only specimen of meconium available for study was obtained by digital means with the result that the cells present were in all probability introduced from the skin about the anal area. If reliance is to be placed on this test, obviously great care must be exercised in obtaining the stool specimen and the smear obtained from the center of the stool where no contact with the skin surfaces has occurred.

4. Tests for bile in the meconium were negative.

At operation by Dr. Gordon F. Madding of our clinic, the stomach and duodenum were markedly dilated and the dilatation ended sharply at the lower end of the descending or second portion of the duodenum below the entrance of the common bile duct. The intestine at that point was represented by a cordlike structure approximately one-half inch long. The small and large intestines were collapsed and in malposition. The cecum was incompletely rotated and rested in the upper portion of the abdomen in the midline. A side-to-side duodenojejunostomy was carried out.

Following surgery, the stomach was aspirated frequently and hydration maintained by parenteral Dextrose-Amigen-Ringers solution**. On the third postoperative day dextrose water was given by mouth and the next day, liquid S. M. A. Postoperative x-rays, using umbrathor, revealed no duodenal obstruction or delayed emptying of the stomach. The baby was discharged on the tenth postoperative day, having regained her birth weight. Monthly checks since then have revealed normal growth and development.

COMMENT

In conclusion, I have attempted to bring together the diagnostic problems concerning abdominal emergencies that have confronted me in private practice with the hope that the result has been practical.

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(a) To be published in Annals of Surgery.
*Manufactured by Heyden Corp., New York, N. Y.
**Mead Johnson Co.

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CONSERVATIVE MANAGEMENT OF CHRONIC CERVICITIS

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Chronic cervicitis is one of the most frequently encountered physical disorders in women. Of 500 women eligible for treatment at the Garment Workers' Health Center in Dallas, Texas, 300 were examined by the internist from August 1, 1947, to February 1, 1949. Of this number, 150 had gynecological complaints. And, 95 (or almost one-third of the total number examined) had chronic cervicitis in various degrees. This includes varying forms of erosion, chronic cellulitis and fibrosis, cysts, polyps, lacerations with infection, eversion, and malignant changes.

ETIOLOGY

The etiologic production of cervicitis is usually attributed to infection; however, there are cases of erosion of the cervix in which it is difficult to discover an infection as a preceding involvement. An alterration in the vaginal pH from its normal 4.5 favors growth of pathogenic bacteria. It is thought that the pH of the vagina may be the cause of obscure cases of erosion in young virgins. It is also felt by some gynecologists that tampons may influence the development of cervicitis in these nulliparous women.

The most common cause of cervicitis in multiparous women is labor and delivery. Infective processes are most often superimposed on some form of trauma such as that produced during childbirth with bruising and lacerations, in some previous instrumentation, or as the result of an acute infection overwhelming the defense mechanisms. There is a resulting residue of bacteria in the endocervical glands and tissues of the portio vaginalis and adjacent structures. The chronic infective organism is usually a streptococcus but its invasion is usually made possible by an acute onslaught in which organisms such as *Neisseria gonorrhoeae, Escherichia coli,* pneumococci, some types of staphylococci, diphtheroids, *Mycobacterium tuberculosis,* and other less common bacteria, were producers of the initial acute process. The foregoing acute infection destroys the defense barriers of the tissues and allows the invasion of the streptococci. It is not known whether *Trichomonas vaginalis* and *Monilia albicans,* have an invasive property in themselves, but it is believed that they act in symbiosis with pathogenic bacteria and allow deeper chronic involvement. In chronic cervicitis, whatever the modus operandi, one of the streptococcus or staphylococcus groups will usually be the residual bacterial agent.

PATHOLOGY

All types of cervical infections should be classified under the heading of cervicitis. Subheadings such as endocervicitis, erosion, and cystic cervicitis, merely designate the degree to which the pathologic process has advanced. Fundamentally, the progression of the tissue changes in all these conditions is quite similar. Infection is followed by congestion with hypersecretion of the cervical glands; granulation tissue is infiltrated with polymorphonuclear leukocytes and bacteria. There is desquamation of the squamous cells covering the portio and finally replacement by columnar epithelium. There is drainage of this infection by the extensive lymphatic system from the diseased cervix to the adjacent tissues, ligaments and organs; namely, the parametrium or broad and uterosacral ligaments, pelvic vessels, and urinary tract.

SYMPTOMATOLOGY

Symptoms resulting from chronic cerical involvement may be purely local or

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more extensively systemic. There is individual variation in the degree of distress. Rather extensive involvement of the cervix may produce surprisingly little discomfort in some cases and the diagnosis may be determined only by examination. In others, the involvement may be mild but symptoms are of an unwarranted severity. Leukorrhea usually accompanies any degree of chronic cervicitis and is the most frequent finding. Pruritis may be associated with the leukorrhea. Pelvic weight or heaviness is often aggravated by fatigue due to lymphatic and vascular congestion, and, if the paracervical ligaments are much involved, may result in actual pain in the lower abdomen on both sides. Dyspareunia is frequently complained of. Backache is usually due to uterosacral involvement. Urinary frequency and urgency are due to trigonitis. Menstrual irregularities or abnormalities and increased dysmenorrhea sometimes accompany chronic involvement. Metrorrhagia should lead to careful search for any possible early malignant process.

As recently pointed out by L. V. Dill[2] and Krohn *et al*,[9] sterility is sometimes the result of cervical infections. Also, chronic cervicitis may act as a focus of infection in more remote regions, and last, and of utmost importance, cervicitis is definitely a precancerous lesion.

DIAGNOSIS

A general systemic examination is as essential in dealing with pelvic conditions as in dealing with conditions in any other system of the body. Leukorrhea is the most frequent symptom of cervicitis, and the nature of the discharge should be sought and its origin ascertained. Cultures and smears are advisable to determine the presence of *Neisseria gonorrhoeae*, *Trichomonas vaginalis* or *Monilia albicans*. There is likely to be a suggestive odor and consistency to the secretions associated with the foregoing types of infection. Malignant processes have an odor of necrotic tissue and the secretions may be watery and blood-stained.

Palpation should acquaint the examiner with the tone of the tissues of the vagina, the thickening of supportive ligaments, and the position, size and consistency of the cervix, the fundus and the adnexae. Crawford, Collins and Weed[10] recently pointed out that moving the cervix from the right to left fornix, and left to right fornix, and then anteriorly, making the various ligaments taut, will reproduce the pains complained of in the lower abdomen and back. Lacerations and Nabothian cysts may possibly be more readily palpated than visualized. Palpation through the rectum is advisable as the adjacent cervical tissues and uterosacral and broad ligaments are often more accurately palpable by rectal than by vaginal examination.

With a good light and the vagina well exposed, inspection of the cervix should be for erosions, lacerations, edema, polyps, cysts, bleeding points and ulcerations. Endocervicitis may be difficult to demonstrate. The canal when dilated is granular and often soft. A thick tenacious mucopurulent or mucoid plug is seen coming from the canal. This material is difficult to dislodge. Retention or Nabothian cysts from following the plugging of the cervical glands by surrounding cervical infection. This will change the clear mucus to a thick purulent material. Eversions are accompanied by deep lacerations. The endocervical canal is hypertrophied and edematous.

Any reddened area about the cervix may be a carcinoma. There is nothing to distinguish grossly a benign from a malignant lesion. Both bleed when traumatized. It is advisable that tissue be removed for biopsy from all lesions of the cervix, particularly from papillary or polypoid growths, regions which tend to bleed after slight trauma, or obvious ulcers and areas of leukoplakia. It cannot be emphasized too greatly that biopsy and cytological smears should be used freely in the office.

TREATMENT

It is essential to correct any general physical deficiencies noted; that is, by use of nutrition, iron, vitamins, liver, estrogens, thyroid and sedation. Penicillin or sulfa drugs are to be given as indicated. To treat cervicitis, one must be aware of

the biologic characteristics of the normal vagina with particular relationship to the pH and vaginal flora.

Karnaky[2] noted that it was essential in cervicitis and vaginitis to produce a buffering effect so as to promote the reestablishment of the physiologically correct acidity (pH 4.5) and growth of Döderlein bacilli consistent with a healthy vagina. Roblee[1] noted that the addition of sulfa drugs to the pH factor was a great improvement in the management of cervicitis and vaginitis. He also obtained excellent results in the control of infections by the use of sulfonamides and buffered acid jelly, after cauterization or conization of the infected cervix. This jelly gives equally good results when used for mild cervicitis postpartally, or in preparation of the cervix before cauterization or surgery.

In the past two years, penicillin in oil and wax intramuscularly has been used for the treatment of chronic cervicitis. In more refractory cases and in badly diseased cervices previous to surgery, penicillin in large doses, intramuscularly, may give good results.

It is also necessary in the treatment of chronic cervicitis to eradicate the lesion. Actual destruction by some form of heat treatment such as the nasal tip cautery or electrocoagulation is universally employed and may be used in a physician's office with good results and without too much discomfort to the patient. Best results are obtained with the nasal tip cautery in superficial lesions and Nabothian cysts. It is best to cauterize the endocervical canal at the midcycle with deep radial stripping incisions. In the topical cauterization of an ectropion or eversion, all areas are touched with the cautery tip until the areas turn a yellowish grey. Nabothian cysts are punctured and the cyst walls are cauterized. For cases of deep lying infections in the compound racemose glands of the endocervix, conization will completely remove the diseased tissue with no damage to the rest of the portio.[8] This is, however, not an office procedure.

In the multiparous woman with an expatients seen in this group had chronic cervicitis in various degrees. Further chronic cervicitis was encountered in two-thirds of all women seen with a gynecological finding.

It was noted that women who had had an abortion or had delivered one or more babies were more likely to have a cervicitis. This is in keeping with the universal understanding on this subject. It was also observed in the histories that very few of these women had had adequate postpartal tensively scarred, cystic, and infected cervix, extirpation is the soundest method of treatment, whether by amputation, or if there is any other pelvic pathology, a total hysterectomy would be advisable. Before surgery, the cervix should be cleaned insofar as possible with a multiple sulfa preparation and douches, occasionally cauterization, and in some more refractory cases, with penicillin.

ANALYSIS OF STUDY OF 300 WOMEN

As stated previously, in this series of 300 women, 95 or one-third of all the care. There were 11 nullipara and 84 parous women and 7 nulligravida and 88 women that had been pregnant.

As could be expected, the greatest number of women were in the third decade of life. There was 1 teenager, 17 in the twenties, 43 in the thirties, 26 in the fourth decade, and 8 were fifty years of age or over.

There were 62 white, and 33 colored patients. The gynecological complaints noted in order of their frequency were: vaginal discharge; pain in the lower abdomen; backache; urinary disturbances, namely, burning dysuria, frequency, incontinence, and nocturia; a heavy or dragging feeling in the pelvis and back; dysmenorrhea; excessive uterine bleeding; dyspareunia; pruritis; and irregular vaginal bleeding. The other findings or complaints noted by the internist in these women were: Menopausal symptoms, upper respiratory infections, nervousness, gastrointestinal complaints, fatigue, positive serology in five, and anemia.

Upon pelvic examination, 45 women had a relaxed perineum and 33 had cystoceles. In the cervicitis group and according to the degree of cervicitis, 29 had a mild cervicitis, 41 had a moderate cervicitis and 25 had an extensive degree of cervicitis. In 13 patients, the cervix was moderately enlarged and in 19, the cervix was markedly hypertrophied. Ten had a partial or total stenosis of the cervix. Nabothian cysts were encountered in 16, and marked lacerations were noted in 16. In 9 the cervix bled easily upon touch. Twelve patients had an associated vulvovaginitis of which 5 had senile changes, 6 had a *Trichomonas vaginalis* vaginitis and one had a *Monilia albicans* infection.

The uterus, but not the cervix, had been removed in 7 cases. The uterus was retrodisplaced in 19 patients, fixed in 4, enlarged in 39 and fibroids were noted in 12. Parametritis of varying degrees was noted in 37 patients at the time of their initial gynecological examination. Salpingitis was noted in 4 and enlarged or cystic ovaries were noted in 6. Five patients had had previous adnexal surgery and 1 had had a myomectomy.

During the early period of this series, vaginal or cervical cytology was not available; therefore, 26 of this group failed to have this procedure. Of the 69 that did have a cervical cytology, there were 5 positive and 64 negative reports. Of the 5 positives: (1) The repeat cytology was negative and 2 biopsies revealed a chronic cervicitis. (2) Repeat cytology was positive, but the biopsy showed a chronic cervicitis; however, a hysterectomy was recommended. (3) Repeat cytologies were negative. (4) Repeat cytology showed atypical cells and later was negative; a hysterectomy was done and sections of the cervix showed chronic cervicitis. (5) Repeat cytology was negative. Amputation of the cervix for biopsy was negative for carcinoma and many repeated cytologies have been negative.

In all patients in whom there was a suspicious lesion of the cervix, or atypical cells were noted, repeated cytologies and biopsies were taken.

Sixteen cervical biopsies were taken of which 4 were negative, 8 showed chronic cervicitis, 1 polyp was found, 1 instance of keratosis of the cervix was noted and there were 2 papillomas. In 1 patient, the papilloma was described as being potentially malignant and a hysterectomy was recommended, but the patient declined. At follow-up examination, the cervix appeared healthy and cytological studies have been negative. In the other patient with a papilloma, a hysterectomy was done for other pathology and cervical sections were benign.

In keeping with the previous outline of therapy, 80 of the patients with chronic cervicitis were given triple sulfa vaginal cream* or sulfa tablets, along with vinegar douches daily, and were asked to return in approximately four to six weeks, at which time the pelvis was reevaluated. In 5 patients, vinegar douches alone were recommended. In most instances, the patients were continued on the sulfa preparation and vinegar douches. In 1 instance, the patient was sensitive to the drug so the vaginal cream was changed with good results. In 5 patients with the associated senile vaginitis, an estrogen cream** was used. In 3 patients with an associated *Trichcomonas vaginalis* vaginitis vioform suppositories were used.

In view of the fact that penicillin is effective in the treatment of the various cocci, it was used in the refractory cases of cervicitis and also as indicated for other complicating conditions in these patients. Penicillin, 300,000 units in oil and wax, intramuscularly, was given once to 9 patients, twice to 6, and three or more times to 13 patients. In 5 of these patients, it was used in the treatment of syphilis. The use of penicillin is in keeping with the very recent work of Krohn *et al*[9] on the study of infertility and chronic endocervicitis.

In addition to the specific therapy for

*Triple Sulfa Cream (Ortho). Sulfathiazole and Beta Lactose (Upjohn)

**Dinestrol cream (Ortho).

cervicitis as noted above, the patients were instructed to take an adequate high protein diet, and were given vitamins, iron, liver, estrogens, thyroid, and sedatives for their systemic needs; many of these patients being nervous, debilitated, and having numerous menopausal complaints.

After the cervices had been reevaluated following the use of multiple sulfa cream for four to six weeks, the more morbid cervices were cauterized with the nasal tip cautery. Thirty-five cervices were cauterized once, 10 were cauterized twice, 2 were cauterized three times and 1 four times.

In most instances, the patient returned after the first visit feeling very much better generally and with few of the previous complaints. The appearance of the cervix was improved and the thickening noted in the parametrium and about the uterosacral ligaments and subsided considerably. Of the 95 patients, 2 patients were not asked to return because of the mild nature of the cervicitis. Eighteen other patients did not return. Sixty-seven patients felt much better and 8 patients noted no improvement following the above therapy. Backache was definitely improved in 21 and remained about the same in 2. Thirty patients noted a definite improvement of the lower abdominal pain. The vaginal discharge cleared up completely in 15, and the parametritis had completely disappeared in 13.

The cervix was healthy in 20 patients. definitely improved in 18 and improved but with still some erosion, lacerations and hypertrophy in 16. No change was noted in the cervix of 3.

Hysterectomies were recommended in 18 patients with a badly diseased cervix, of which 12 had large uterine fibroids and 4 had adnexal complications. In the latter group of patients, in all instances, the cervix had greatly improved, but it was felt that the diseased organ would be better removed as it was potentially malignant and might also act as a foci of infection. In all instances in which the cervix was badly diseased, the uterus remained abnormally enlarged.

Sixteen patients had cervical biopsies; 1 had a *D & C* for menorrhagia with good results; and 1 patient with a positive cytology and badly diseased cervix had a *D & C* and amputation of the cervix. The biopsy was negative and the subseqent cytologies have been negative.

Four total hysterectomies were done; one for fibroids with excessive bleeding with good results; a vaginal hysterectomy for an enlarged uterus with excessive bleeding; and a papilloma of the cervix with good results. A total hysterectomy was done on a patient with fibroids, menorrhagia, and with two atypical cytologies reports—with good results and no malignancy. The other total hysterectomy was done for fibroids and menorrhagia with good results.

DISCUSSION

It is felt that with the use of triple sulfa vaginal cream or sulfa tablets, the milder types of chronic cervicitis may be treated and controlled; and in the more severely involved cervices before and after cauterization and conization, these preparations will greatly help in reducing the foul odor, the discharge from slough, bleeding, stenosis from scar tissue formation, and in decreasing the healing time.

In cases of a chronic cervicitis in which a total hysterectomy is anticipated, the use of the sulfa drugs will reduce the chances of spillage of pathogenic organisms into the peritoneal cavity.

One must keep in mind that some patients may be sensitive to the sulfa preparations in which case other buffered preparations or antibiotics should be used.

Following either cauterization or conization of the cervix, the patient should be warned that there will be an increase in vaginal discharge which will persist for approximately two weeks. There may be bleeding as late as two weeks and at times this may be excessive. This is particularly true in severely diseased cervices and following conization or amputation of the cervix. It may be necessary to hospitalize the patient to control the bleeding. The pelvic aches and urinary complications may be exaggerated for a few days, but usually subside after the cervix begins to heal. One should

also bear in mind that a cellulitis, pelvic abscess, or even a peritonitis may occur following these precedures and should be treated accordingly.

It is essential that the patient return for periodic postcauterization or postoperative dilatations of the cervix so as to prevent a stricture of the cervical canal. This may lead to a complete stenosis and a resulting pyometritis with a later need to remove the uterus. If recauterization of the cervix is necessary, this should wait for at least two or three months.

CONCLUSIONS

1. Chronic cervicitis is one of the most frequent physical disorders seen by the general practitioner or gynecologist.

2. Multiple sulfa preparations may be used with good results in the treatment of chronic cervicitis.

3. Multiple sulfa preparations are of great value in the postpartal state and in the precauterization and postcauterization and operative treatment of the cervix and the vagina.

4. Penicillin in oil and wax is effective in the more refractory cases.

5. Cauterization of the cervix is of great value in eradicating the infections in superficial lesions of the cervix and endocervix and in the treatment of eversions and Nabothian cysts.

6. In more deep-lying infections, conization, or amputation of the endocervix will give better results.

7. In extensively scarred, cystic, and infected cervices, particularly if there is other pathology of the uterus, a total hysterectomy is advocated.

8. One must be constantly alert for the early detection of carcinoma of the uterus with the use of cervical cytology for screening purpose and biopsy examination of all suspicious lesions.

9. Correction of chronic cervicitis should assist in the reduction of malignant changes of the cervix.

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SOCIALISTIC LEGISLATION BEING CONSIDERED IN CONGRESS

The American people of today, never having lived under serfdom, are lightheartedly considering how they would trade liberty for security and lose freedom.

Each Congress in the past decade has had before it a greater number of bills calculated to accomplish this end. Not the least of these bills are three receiving attention during the early part of the second session of the 81st Congress.

HR Bill 6000 has already passed the House under special conditions under which it was arranged by the party in power that there should be a limitation of debate and no amendments accepted. This Bill is primarily a most ambitious social welfare proposal. It does, however, contain one provision having serious medical implications, namely, that section on compulsory, contributory, permanent and total disability insurance. This insurance would supply total medical care to such a group of those disabled individuals who come under its scope.

The American Medical Association has gone on record as opposing the whole Bill. This position was reasonable and calculated to protect the interests of the profession, and particularly those of the nation as a whole, because with such an entering wedge, universal medical coverage by the State Medicine route would be just a matter of a few years and a few more Bills to manipulate it.

Other students of legislation have attacked the Bill on broad grounds. It is stated that the Bill is a replica of the British National Insurance law. It is also quite clear that if the Bill should become law, everyone would feel the burden of increased social security, taxes, or income taxes, or both. It is felt that no other piece of legislation now before Congress would rush us so fast toward national bankruptcy and federal control of our lives or families or incomes. No piece of legislation, since the federal income tax was made possible by an amendment to the constitution, would give the federal Government such power over the life of the individual. It is greatly to be hoped that representations made in behalf of organized medicine will be successful in preventing passage of this Bill, and also successful in bringing about an investigation of the whole situation of social security as it is proposed, and as it has been administered in recent years.

Another Bill of a serious and threatening character is the so-called, "School, Health Services Bill." This is S. 1411, which has passed the Senate, and is now pending before the House Interstate Commerce Committee. This Bill, if passed into law, would include a compulsory periodic examination of all school children at public expense, regardless of the financial status of the par-

ents. It further provides that, when indicated, treatment shall be provided, whenever the parents of such children are unable to provide treatment. It further states that a State health agency "may provide for the prevention and treatment of such physical and mental defects and conditions for all school children." It is clear that such a bill would indoctrinate 29,000,000 school children every year to accept the government dole. Investigation of the effects of this Bill show that it would add nothing to the child's welfare. It would place the direction of that medical care meant for the child under a central bureaucratic control.

For these reasons, the House of Delegates has reaffirmed its position taken previously that the Bill should be opposed as a whole.

A third Bill now waiting action is dangerous to the public and to medicine. This is the so-called "Federal Aid to Education" Bill, S. 1453, and its companion Bill HR. 5940. The Bill has passed the Senate and has been favorably acted upon in the House by the Interstate and Foreign Commerce Committee. It has been referred to the House Rules Committee with a recommendation for passage.

These Bills are predicated upon a presumed emergency in medical education, which is in fact fictitious, since the annual number of admissions to medical schools is now approximately 7000, compared to an average of 6,016 for the ten years preceding the War, and since the increase in the physician population from 1940 to 1948 was 14 per cent as against a 12 per cent increase in the general population. In other words, there has been a relative increase in physician population of more than 16 per cent. These Bills lay the groundwork not only for the nationalization of all existing and projected medical schools, but also for the nationalization for all existing and projected osteopathic, optometric, dental, dental hygiene, nursing, public health, and practical nursing schools. The possibility under the action of this Bill is the provision for federal scholarships in these various fields, which would allow for the subsidy of unqualified political appointees, and such would nullify the effort of admissions committees to maintain standards. One provision of the Bill would place the schools of nursing under a central board of certification, principally under the control of the Surgeon-General. A tentative list of accredited schools has already been prepared, the effect of which would be to legislate out of existence some 200 hospital schools of nursing, which would be excluded from the list. The total effect of this Bill would be to buy in within a very few years the whole field of medical education.

The House of Delegates of the AMA, at its recent meeting, has gone on record as opposing the Bill.

The proponents of socialization of medicine in the United States have advocated the passage of an omnibus socialization bill. This was S. 1679. As we well know, they have been unsuccessful in getting favorable action on this Bill. They have, however boldly announced that they will pass the Bill, one section at a time.

Consideration of such Bills as these three discussed here shows clearly that they fit into such a scheme. It is vitally necessary, therefore, that we inform our representative in Washington of the position that organized medicine has taken in opposing these three bills. It is our duty to the community, and in the interests of the profession that we strenuously oppose any legislation adapted to the plan expressed by the formula "Tax and tax. Spend and spend. Elect and elect."

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NEW ORLEANS GRADUATE MEDICAL ASSEMBLY

The New Orleans Graduate Medical Assembly will have its Thirteenth Annual Meeting March 6-9, 1950.

It promises to be interesting and informative. In years past, physicians from near and far have had pleasure and benefit in attending. In recent years, attendance has been somewhat limited by difficulty in securing hotel reservations. As this situation

has improved somewhat, continued growth in the size of the meeting is expected.

Eighteen guest speakers, who are outstanding in their several fields, have been secured. Each will talk three times, and will cover a wide range of topics in the field of medical interest. As in the past, efforts have been made to have the various papers consider those aspects of medicine which are of daily significance to the practitioner. It would be well for those who plan to attend to secure hotel reservations promptly.

Following the meeting of the Assembly, a postclinical tour has been arranged. This year it covers San Juan, the Virgin Islands, the Dominican Republic, Jamaica, and Havana. The travelling is to be by air, leaving New Orleans, March 11, and returning to New Orleans, March 26. An excellent medical program is planned, with lectures, visits to hospitals, and the opportunity to observe tropical diseases and Public Health problems. Extensive sightseeing in this winter vacation land, time to shop, and plenty of leisure, and luxurious resort hotels, all combine to make this a memorable trip in the congenial companionship of the members of the profession and their families.

The New Orleans Graduate Medical Assembly continues to be of great service to physicians in covering the broad aspects of medicine.

ORGANIZATION SECTION

The Executive Committee dedicates this section to the members of the Louisiana State Medical Society, feeling that a proper discussion of salient issues will contribute to the understanding and fortification of our Society.

An informed profession should be a wise one.

1949 INTERIM MEETING OF AMA

Following is report submitted to the Executive Committee by delegates to the meeting of the AMA held in Washington, D. C. in December:

Your delegates, Dr. J. Q. Graves and Dr. Val Fuchs, attended the interim meeting of the House of Delegates of the American Medical Association in Washington, D. C., December 6-8, 1949.

The House was called to order by the Speaker, Dr. L. Borzell, at 10:00 a. m. sharp and the reference committee on credentials reported 179 delegates registered out of a possible 190. At the afternoon session on the first day this attendance was increased to 187 out of 190 accredited delegates which was one of the best attendance records for the House.

The first order of business was the award to the general practitioner of the year. The three names submitted were Dr. Andy Hall, Mt. Vernon, Illinois, Dr. L. Hare, Cedar Rapids, Iowa, and Dr. Thomas E. Rhine, Thornton, Arkansas. On the second ballot Dr. Andy Hall was declared winner.

The secretary gave his report and stated that 145,036 physicians are now carried on the rolls of the Association, an increase of practically 5,000 members over the previous year and 10,000 over the membership for 1947. The number of Fellows of the Association also showed a gratifying increase; there being 81,053 on September 1, 1949 as compared with 77,816 on the same date in 1948 and 75,424 in 1947.

Amendments to the Constitution and By-Laws, as approved by the House of Delegates at a previous meeting, were adopted.

The report of the Board of Trustees was a very lengthy one and in it a suggestion was made that reconsideration be given by the House to the report of the reference committee adopted an June 9, 1949 so that the section in regard to general practice sections in hospitals be revised to the effect that such sections be recommended to hospitals and not made mandatory.

Committees were in session on Tuesday afternoon and all day Wednesday and reports were presented at the Thursday morning session. This was an unusual procedure since the House of Delegates is sup-

posed to meet on the afternoon of the second day to receive all committee reports, however due to inability to secure space in which to hold this meeting it was deferred until the morning of the third day.

The House adopted a resolution authorizing the Board of Trustees to set dues up to a maximum of twenty-five dollars per year. This is to be a yearly provision and the recommendation was made, approved and adopted that the dues for 1950 will be twenty-five dollars. This does not include Fellowship dues of twelve dollars which entitles a doctor to receive the Journal of the AMA. In other words Fellowship dues and subscription to the Journal are in addition to membership dues. It is also understood than any man who is excused from paying dues in his local state society is also exempt from dues in the AMA. Again, any man who is delinquent in payment of dues to the AMA for a period of thirteen months will be dropped from membership in the AMA but this will have no effect on his state and local society membership. It was agreed that the state societies should be asked to collect these dues.

Senate Bill 1411, the "School Health Service Act" was acted upon as follows: "We recommend that this bill in its present form be opposed. On page 6 of the printed bill, Section 6 (a), (1) there are three provisions, A, B and C. A provides for periodic medical and dental examination of school children; B provides that, where indicated, treatment shall be provided 'whenever the parents of such children are unable to provide treatment' and these sections are acceptable. Section C, which permits schools to provide treatment for *all* school children, is an unwise provision and makes it necessary to oppose S. 1411."

In regard to House Bill 6000, "the AMA recognizes the need for assistance to the disabled needy and feels that this aid should always be administered on a local level. Financial assistance to the locality should only be advanced from state or federal sources when a need can be clearly shown."

Several states have developed programs whereby patients can present grievances to committees of their respective associations and it was recommended that all states adopt comparable programs at the earliest possible time.

The name of "Hygeia" has been changed to "Today's Health" with Dr. W. W. Bauer, as Editor and Dr. William Bolton, as Associate Editor. Ellwood Douglass continues as Managing Editor of the magazine.

Group health and hospital programs were again stressed and a resolution was passed making it compulsory to have approval of both the state and local medical society for AMA approval. It was also made mandatory that such organizations complete one year's function before the AMA seal of approval will be extended.

National Commander George N. Craig, of the American Legion, appeared before the House and assured the members that the American Legion will strongly support the American Medical Association's anti-administration battle. He stated that Oscar R. Ewing and other proponents of the federal health plan should be told "We have just begun to fight".

A resolution was passed requesting information on the present state of preparation for civil defense in connection with medical and health problems.

The group recommended the construction of a new Army Medical Library Building. It also urged raises for public health officers both local and federal.

The Air Force was recognized as a separate arm of the Defense Department and it will be permitted a delegate in all future meetings.

Senate Bill 1453, providing financial aid for medical schools was opposed on the ground that federal control would result.

A committee was named to study non-service connected disability as now provided by the Veterans Administration with the idea of ascertaining how this service can be given under private care.

There was approval by the House of another resolution which declared that there is "urgent need for a national blood program capable of immediate expansion in

event of a local disaster or a national emergency". The Red Cross was named as the proper agency to handle this.

The total registration at this meeting was 8.487, which included 4,258 physicians and 4,229 guests.

Louisiana was fortunate in having both of its delegates appointed to committees; Dr. Graves to the Committee on Blood Bank and Dr. Fuchs to the Committee on Miscellaneous Business.

VAL H. FUCHS, M. D.

J. Q. GRAVES, M. D.

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LOUISIANA STATE MEDICAL SOCIETY NEWS

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
East Baton Rouge	Second Wednesday of every month	Baton Rouge
Morehouse	Second Tuesday of every month	Bastrop
Natchitoches	Second Tuesday of every month	
Orleans	Second Monday of every month	New Orleans
Ouachita	First Thursday of every month	Monroe
Rapides	First Monday of every month	Alexandria
Sabine	First Wednesday of every month	
Second District	Third Thursday of every month	
Shreveport	First Tuesday of every month	Shreveport
Vernon	First Thursday of every month	

Louisiana physicians and surgeons have been invited to attend a three-day seminar on cancer which will be held at the Medical College of Alabama in Birmingham on February 21, 22 and 23.

It will be conducted by at least ten specialists widely recognized for their work in their various fields and will give doctors the opportunity of hearing comprehensive expositions of the most modern and effective methods of cancer detection, diagnosis and treatment.

The seminar will be the first large scale session of its kind ever conducted in Alabama. It is being sponsored jointly by the Medical Association of Alabama, the Jefferson County Medical Society, the Extension Division of the University of Alabama and the Alabama Division of the American Cancer Society.

Several hundred doctors are expected to attend. Invitations are being extended to members of all state and county medical societies throughout the Southeast and out-of-state representation likely will be large. There will be no registration fee.

Dr. Karl F. Kesmodel, of Birmingham, Chairman of the American Cancer Society's Committee on Arrangements, said that the program had been arranged to give doctors up-to-the-minute information they indicated they wanted most on new and advanced methods of detection, diagnosis and treatment.

"The committee also has kept in mind," Dr. Kesmodel said, "the dissimilar problems that confront the specialist and the general practitioner. The subjects and the method of presentation will give them information most useful to both of them."

The first day's sessions will be climaxed by a dinner at Hotel Tutwiler at which the speaker will be Dr. Charles S. Cameron, Jr., of New York, Medical and Scientific Director of the American Cancer Society.

Reservations for the seminar should be made through Dr. Kesmodel at this offices in the Medical Arts Building in Birmingham. Hotel reservations, however, should be made direct with the headquarters hotel, The Tutwiler, or with Hotel Molton or Hotel Redmont which are nearby.

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NEWS ITEMS

The annual Neuropsychiatric meeting at the VA Hospital, North Little Rock, Arkansas, for 1950 will be held at that hospital on February 23-24, 1950. A a number of nationally known leaders in neuropsychiatry and related fields are expected to participate, including Drs. Walter Alvarez, Daniel Blain, Edwin F. Gildea, Karl Menninger, John N. Rosen, and others. There will be no charge for registration and attendance of all interested personnel will be welcomed. Further information may be obtained by writing to the Director of Professional Education, VA Hospital, North Little Rock, Arkansas.

Dr. Charles Huggins, Professor of Surgery, The University of Chicago, is going to give the second annual Oncology Lecture sponsored by Louisiana State University School of Medicine on Tuesday evening, February 28, 1950 at 8:15 p. m., in the Auditorium of Charity Hospital. The title of his paper is "Significance of Serum Proteins in the Diagnosis of Disease".

The medical profession is cordially invited to attend.

Send Request for Hotel Reservations, During Annual Meeting, to Dr. Edward G. Cailleteau, 316 Louisiana National Bank Bldg., Baton Rouge, La.

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The Bi-Parish Medical Society met in the Educational room of the Clinton Baptist Church, Clinton, La., December 14, 1949. After an excellent dinner prepared by Mrs. Willie B. Hubbs and assistants, we went into the business and scientific program.

Election of officers for 1950 resulted as follows: President, Dr. L. F. Magruder, Jackson, La.; Vice-President, Dr. L. R. Young, Jackson, La.; Secretary-Treasurer, Dr. E. M. Toler, Clinton, La.

Delegates to the Louisiana State Medical Society meeting—Dr. E. M. Toler, Clinton, La., and Alternate, Dr. C. S. Toler, Clinton, La.

Dr. C. S. Toler read an interesting and instructive paper on some of the recent drugs, such as, penicillin, streptomycin and the sulfonamides. The paper was favorably discussed by members present.

Mr. Jack Craig of Baton Rouge, La., representative of E. R. Squibb and Sons gave us instructive informative presentation on nutrition and vitamin deficiencies, which was favorably received by the guests and profession.

Several new members were added to our corps of physicians.

The Society adjourned to meet in the East Louisiana State Hospital, the first Wednesday of March, 1950.

A meeting of the Webster Parish Medical Society was held at the Minden Sanitarium, at 7:30 p. m., Tuesday, December 6, 1949.

A turkey supper was served the doctors by the Sanitarium. There were present 13 members of the Society and two visitors from outside the Parish.

Representatives from the Board of the Webster Parish Welfare Department met with the doctors and discussed a plan to have a rotating board of three doctors examine the applicants for welfare disability assistance once a month. The plan was approved and in the future three doctors will serve at Springhill and three at Minden.

Dr. Ralph Riggs of Shreveport gave a talk on treatment of injuries of the nose and face. This talk was illustrated with lantern slides.

Dr. L. B. Van Horn was elected a new member of the Society.

Election of officers to serve for 1950 was held with the following results: Dr. W. R. Garrett of Springhill was elected President, Dr. James Boren of Springhiill was elected Vice-President. Dr. C. M. Baker of Minden was re-elected Secretary-Treasurer. Dr. C. M. Baker was elected Delegate to the State Meeting with Dr. T. A. Richardson as Alternate.

SPECIAL REQUEST

Supply of August, 1949 and September, 1949 issues of the Journal is exhausted, and it is requested that doctors who have no more use for their copies send them to the office of the Journal.

STAFF OF ST. PATRICK'S HOSPITAL IN MEMORIAM

The Staff of St. Patrick's Hospital recognizes a great loss to the profession in the recent death of one of its outstanding members, Thomas Henry Watkins.

Dr. Watkins, who died October 29, 1949, was admired by all of us for his devotion to our profession, his untiring energy, his charity and fidelity and his kind and considerate assistance given the younger men of the profession.

With Dr. Watkins' demise we recognize the termination of an era in the practice of medicine of which he was typical, that is, the transition from the "horse and buggy" stage to the development of modern medical practice. He learned surgery without having formal training because there was no formal training available. He studied and observed until he was certain of his ability to carry out certain procedures with alacrity and confidence. Ultimately his eminence as a surgeon became well known in the city as well as in the far reaches of the surrounding countryside.

Dr. Watkins' ability as a business man and his integrity were recognized throughout this section. As exidence we point to his position on boards of directors of financial institutions and his office as president of one.

Our profession must live in those of us who carry on its tasks today, but it must draw no small measure of inspiration from the example of those who have gone before, and have passed on to greater fields. Let us, in contemplating their departure, resolve so to conduct our own lives as to pass that inspiration on undimmed to those who in their turn shall follow us.

WOMAN'S AUXILIARY TO THE LOUISIANA STATE MEDICAL SOCIETY

LOUISIANA STATE MEDICAL SOCIETY WOMAN'S AUXILIARY

At the December meeting of the Woman's Auxiliary to the Orleans Parish Medical Society, Mrs. Boni J. De Laureal as President succeeding Mrs. Edwin A. Socola. Following are members of the Board for 1950: President-Elect Mrs. John T. Sanders; 1st Vice-President, Mrs. C. J. Brown; 2nd Vice-President, Mrs. Daniel N. Silverman; 3rd Vice-President, Mrs. William H. Gillentine; 4th Vice-President, Mrs. Edwin H. Lawson; Recording Secretary, Mrs. Edwin S. Kagy; Corresponding Secretary, Mrs. Robert E. Rougelot, Jr.; Publicity, Mrs. George D. Feldner; Treasurer, Mrs. Robert C. Kelleher; Parliamentarian, Mrs. C. Grenes Cole; Historian, Mrs. Tracey T. Gately.

Chairmen of Standing Committes are—Program, Mrs. Anees Mogabgab; Notification, Mrs. Joseph S. D'Antoni; Hostess, Mrs. Jerome E. Landry; Registration, Mrs. J. Morgan Lyons; Membership, Mrs. Richard W. Vincent; Courtesy, Mrs. Cuthbert J. Brown; Telephone and Motor Corps, Mrs. Eugene H. Countiss; Revisions, Mrs. Monte F. Meyer; Archives, Mrs. Edwin R. Guidry; Contact, Mrs. Edwin H. Lawson; Medical Culture, Mrs. Herman B. Gessner; Clothes, Mrs. Lloyd J. Kuhn; Samples, Mrs. Norton W. Voorhies; Public Relations, Mrs. Jules Myron Davidson; Commemoration, Mrs. Carroll F. Gelbke; Printing and Supplies, Mrs. H. Theodore Simon; Red Cross, Mrs. Frederick Fenno; Cancer, Mrs. Louis Leggio; American Heart, Mrs. Willard R. Wirth; Tuberculosis, Mrs. Daniel N. Silverman; Periodic Health, Mrs. Cassius L. Peacock; AMA Bulletin, Mrs. Edwin A. Socola; Honorary Board Member, Mrs. John S. Dunn.

The work of the committees on Clothes and Samples is very interesting. Both of these worthwhile projects have been active ones with the Orleans Parish Auxiliary for many years.

The Clothes Committee collects used clothing frm the members of the Orleans Parish Auxiliary and distributes them to needy medical students. Both men and women's garments are collected as occasionally there are requests from girl medical students. In the majority of cases, the calls for clothes are from G.I. students. In one instance, this committee also furnished a bicycle to an ex-G.I. who had suffered a leg injury. He could not walk the distance to and from the medical school, and he could not afford car-fare. All types of clothing—from sport and business to evening clothes are obtained. On occasion, the Auxiliary also has furnished these students with tickets to operas, concerts, etc.

The Committee on Samples collects any medical samples that the doctors are given by the drug houses and for which they have no use. These in turn are distributed to various institutions and asylums in New Orleans. The samples are carefully sorted, usually by the chairman's husband and only such items as requested by the institutions are given and then only after permission from the attending doctor.

The Woman's Auxiliary to the Tangipahoa Parish Medical Society met in December at the home of Mrs. I. I. Rosen in Springfield. A report was given on the nurse recruitment program. Mrs. C. B. Scott of Ponchatoula, a former instructor in the School of Nursing at Baptist Hospital, Memphis, Tennessee, gave a report on an address she had made. Mrs. Scott had spoken to the girls of the Albany High School on the subject "Nursing As A Career". It was demonstrated by a film, "This Is Your Life."

The Woman's Auxiliary to the Jefferson Davis Parish Medical Society used Christmas as the focal point of its December meeting. The program consisted of a Christmas reading "The Littlest Angel" by Mrs. Jay Baker.

The December meeting of the Woman's Auxiliary to the Lafayette Parish Medical Society centered around Christmas. Each member brought a gift to be given to the children at the Lafayette Charity Hospital. Approximately one hundred gifts from members and friends of the Auxiliary were sent the hospiatl. For a long time this Auxiliary has been interested in helping children at the Charity Hospital. Earlier in the year the Auxiliary made a contribution to the Lafayette Charity Hospital Service Guild to help support the "toy bank" maintained for children at the hospital. During the summer the Auxiliary also sponsored a "Treat Day" for all the patients of the hospital.

The Woman's Auxiliary to the Lafayette Parish Medical Society has given a year's subscription to each of the 20 schools in the parish. The Auxiliary also plans to continue its nurse recruitment program. Ltst spring the Auxiliary gave a tea in honor of the senior high school girls at which talks were made by a medical technician and a registered nurse. The latter discussed their professions as possible vocations for the girls. They explained the entrance requirements, courses of study and expenses. The tea was most successful and the Auxiliary decided to make it an annual event.

Last May the Auxiliary sponsored a style show for the benefit of the American Cancer Society. The show was held in the gymnasium of Southwestern Louisiana Institute which was filled with an enthusiastic group.

Mrs. Daniel M. Kingsley,
Chairman,
Press and Publicity.

BOOK REVIEWS

Acute Appendicitis and Its Complications: By Frederick Fitzherbert Boyce, M. D., New York, Oxford University Press, 1949. Pp. 487. Price, $8.75.

This monograph on acute appendicitis and its complications deserves a place with such classic monographs on appendicitis as those written by Royster and Kelly. The general practitioner and the medical student will find it particularly valuable.

The books is most timely in view of the unwarranted complacent attitude towards appendicitis and its complications which has developed widely as a result of a feeling of security and over-reliance on chemotherapy, blood transfusions and improved anesthesia.

The volume represents a prodigious amount of work done in studying the records of patients with acute appendicitis at the Charity Hospital in New Orleans, reviewing the literature on acute appendicitis and summarizing the critical thought of the author and other observers on the protean manifestations and the vexing problems of management of the commonest acute surgical disease of the abdomen.

The book is lucidly written with arrangement of material in excellent fashion. There are many fine illustrations throughout.

AMBROSE H. STORCK, M. D.

Pollen Slide Studies: By Grafton Tyler Brown, M. D., F. A. C. P. Springfield, Ill., Charles C. Thomas, 1949. Pp. 122, illus. Price, $6.00.

This small book contains all that is necessary to permit aerobiologic surveys in any community in the United States. The drawings of pollen grains and fungus spores are accurate, the photographs are excellent and the descriptions are precise. There are about one hundred drawings and microphotographs which make up a splendid atlas.

Study of the monograph will enable any physician or technician to identify and count the important pollen grains and larger fungus spores which are present in the air. The book is recommended without reservation.

VINCENT J. DERBES, M. D.

Medicine of the Year: Edited by John B. Youmans, M. D. Philadelphia, J. B. Lippincott Company, 1949. Pp. 143. Price, $5.00.

Because of the many yearbooks and annual reviews of medicine now being published, one might question the need of another such volume. However, in reading this first issue of MEDICINE OF THE YEAR, one cannot help but welcome this addition. The review includes advances in all fields of medicine divided with reference to specialty. The emphasis is on the therapeutic advances which have proven worthwhile in the last year, although changing ideas in pathogenesis, etc., are presented. There is no accumulation of disjointed facts as is often found in such reviews, but the material is clearly and concisely presented in narrative form, with pertinent references at the end of each chapter. The form of presentation, (large, bold print, double columns, flat, non-cumbersome volume of one hundred and forty-three pages), allows for pleasant expeditious reading, and is a ready source of usable information. When reading this refreshing review, one is convinced that the editors have succeeded in their object to "provide the practitioner with a readable, brief, concise presentation of the changing events in medicine during the preceding year and help him keep abreast of progress."

E. W. A. OCHSNER, JR., M. D.

PUBLICATIONS RECEIVED

W. B. Saunders Company, Philadelphia: Physiology of Heat Regulation and the Science of Clothing, Edited by L. H. Newburgh, M. D. Medical State Board—Questions and Answers, by R. Max Goepp, M. D., and Harrison F. Flippin, M. D., Eighth Edition. Electrocardiography—Fundamentals and Clinical Application, by Louis Wolff, M. D., Illustrated. Clinical Pathology—Application and Interpretation, by Benjamin B. Wells, M. D., Ph. D., Illustrated.

Charles C. Thomas, Springfield, Illinois: Principles and Practice of Therapeutic Exercises, by Hans Kraus, M. D. Intestinal Intubation, by Meyer O. Cantor, M. D., F. A. C. S. Congenital Anomalies of the Heart and Great Vessels, by Thomas J. Dry, M. D., Jesse E. Edwards, M. D., Robert L. Parker, M. D., Howard B. Burchell, M. D., H. Milton Rogers, M. D., and Arthur H. Bulbulian, D. D. S. Helpful Hints to the Diabetic, by William S. Collens, M. D., and Louis C. Boas, M. D. Haemolytic Disease of the Newborn, by M. M. Pickles, M. D.

University Medical Publishers, Palo Alto, California: Handbook of Medical Management, by Milton Chatton, M. D., Sheldon Margen, M. D., and Henry D. Brainerl, M. D., First Edition.

Harcourt, Brace and Company, New York: Human Growth, The Story of How Life Begins and Goes On, by Lester F. Beck, Ph. D.